FREERTOS FOR ARDUINO

SETUP CODEBLOCKS IDE TO USE WINAVR COMPILER AND AVRDUDE

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<>

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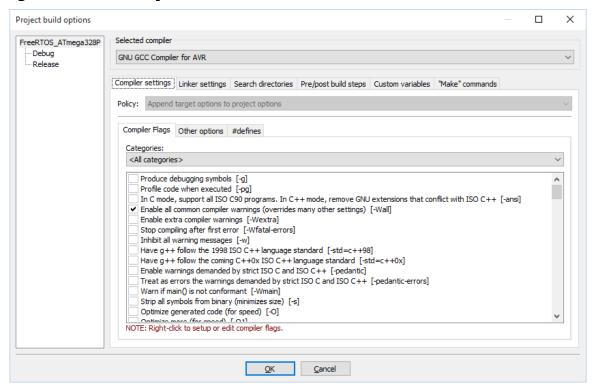
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Executive Summary

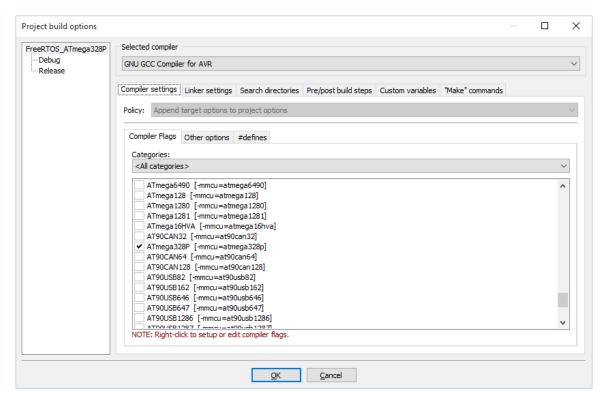
Executive summary goes here ...

CodeBlocks IDE setup

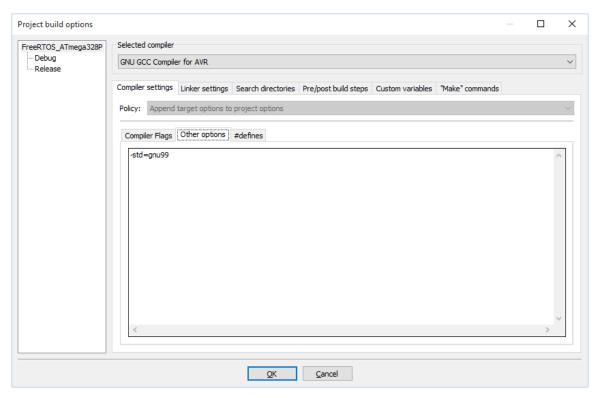
Project Build Options



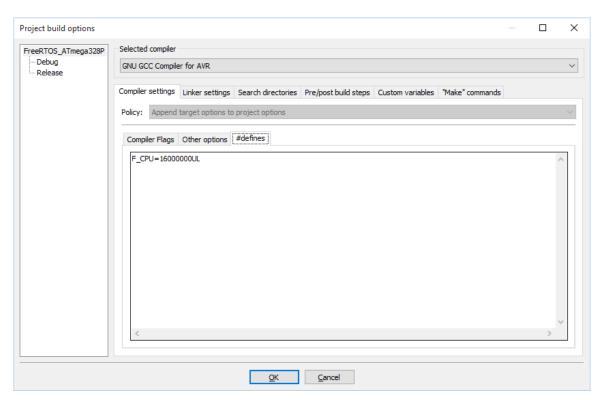
Project build options (Compiler Settings :: Compiler Flags 1)



Project build options (Compiler Settings :: Compiler Flags 2)

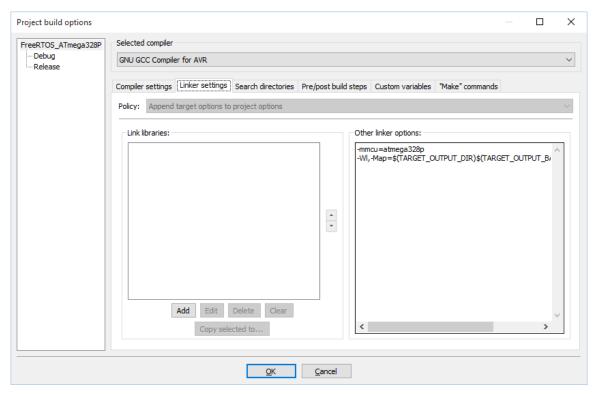


Project build options (Compiler Settings :: Other options)

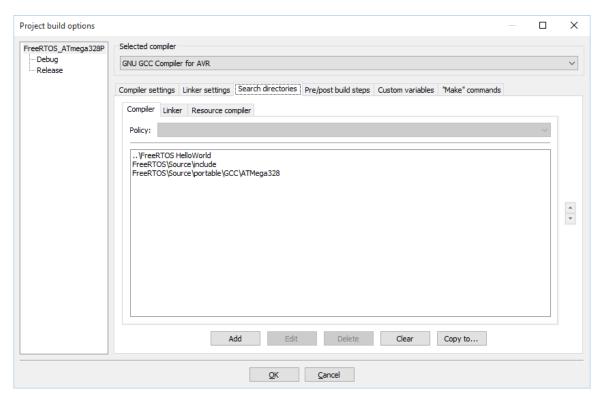


Project build options (Compiler Settings :: #defines)

-mmcu=atmega328p
-W1,-Map=\$(TARGET OUTPUT DIR)\$(TARGET OUTPUT BASENAME).map,--cref

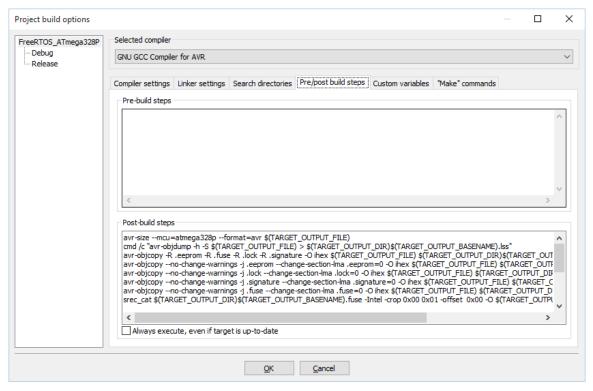


Project build options (Linker Settings :: Compiler Flags)

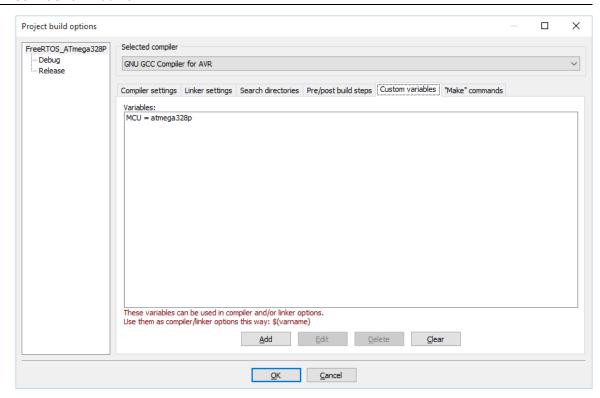


Project build options (Search directories :: Compiler)

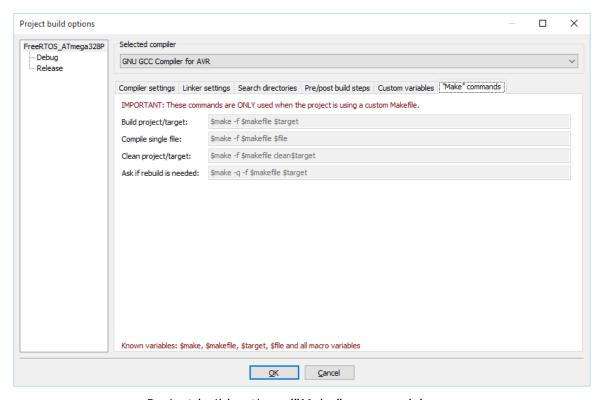
avr-size --mcu=atmeqa328p --format=avr \$(TARGET OUTPUT FILE) cmd /c "avr-objdump -h -S \$ (TARGET OUTPUT FILE) > \$(TARGET OUTPUT DIR)\$(TARGET OUTPUT BASENAME).lss" avr-objcopy -R .eeprom -R .fuse -R .lock -R .signature -O ihex \$(TARGET OUTPUT FILE) \$(TARGET OUTPUT DIR)\$(TARGET OUTPUT BASENAME).hex avr-objcopy --no-change-warnings -j .eeprom --change-section-lma .eeprom=0 -O ihex \$(TARGET OUTPUT FILE) \$(TARGET OUTPUT DIR)\$(TARGET OUTPUT BASENAME).eep avr-objcopy --no-change-warnings -j .lock --change-section-lma .lock=0 -O ihex \$(TARGET OUTPUT FILE) \$(TARGET OUTPUT DIR)\$(TARGET OUTPUT BASENAME).lock avr-objcopy --no-change-warnings -j .signature --change-section-lma .signature=0 -0 ihex \$(TARGET_OUTPUT_FILE) \$(TARGET_OUTPUT_DIR)\$(TARGET_OUTPUT_BASENAME).sig avr-objcopy --no-change-warnings -j .fuse --change-section-lma .fuse=0 -O ihex \$(TARGET OUTPUT FILE) \$(TARGET OUTPUT DIR)\$(TARGET OUTPUT BASENAME).fuse srec cat \$(TARGET OUTPUT DIR)\$(TARGET OUTPUT BASENAME).fuse -Intel -crop 0x00 0x01 -offset 0x00 -O \$(TARGET OUTPUT DIR)\$(TARGET OUTPUT BASENAME).lfs -Intel srec cat \$(TARGET OUTPUT DIR)\$(TARGET OUTPUT BASENAME).fuse -Intel -crop 0x01 0x02 -offset -0x01 -0 \$(TARGET OUTPUT DIR)\$(TARGET OUTPUT BASENAME).hfs -Intel srec cat \$(TARGET OUTPUT DIR)\$(TARGET OUTPUT BASENAME).fuse -Intel -crop 0x02 0x03 -offset -0x02 -O \$(TARGET OUTPUT DIR)\$(TARGET OUTPUT BASENAME).efs -Intel avr-objcopy -R .eeprom -R .fuse -R .lock -R .signature -O binary \$(TARGET_OUTPUT_FILE) \$(TARGET_OUTPUT_DIR)\$(TARGET_OUTPUT_BASENAME).bin avr-objcopy --no-change-warnings -j .eeprom --change-section-lma .eeprom=0 -0 binary \$(TARGET_OUTPUT_FILE) \$(TARGET_OUTPUT_DIR)\$(TARGET_OUTPUT_BASENAME).eep avr-objcopy --no-change-warnings -j .lock --change-section-lma .lock=0 -O binary \$(TARGET OUTPUT FILE) \$(TARGET OUTPUT DIR)\$(TARGET OUTPUT BASENAME).lock avr-objcopy --no-change-warnings -j .signature --change-section-lma .signature=0 -0 binary \$(TARGET OUTPUT FILE) \$(TARGET OUTPUT DIR)\$(TARGET OUTPUT BASENAME).sig avr-objcopy --no-change-warnings -j .fuse --change-section-lma .fuse=0 -0 binary \$(TARGET OUTPUT FILE) \$(TARGET OUTPUT DIR)\$(TARGET OUTPUT BASENAME).fuse



Project build options (Pre/Port build steps)



Project build options (Custom variables)



Project build options ("Make" commands)

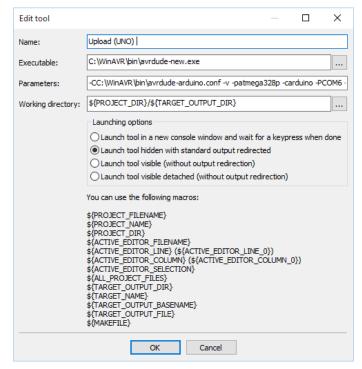
Uploading the HEX files to Arduino:

Using Avrdude as external tool from CodeBlocks

```
Executable:
C:\WinAVR\bin\avrdude-new.exe

Parameters:
-CC:\WinAVR\bin\avrdude-arduino.conf -v -patmega328p -carduino -PCOM6 -b115200 -D -
Uflash:w:${TARGET_OUTPUT_BASENAME}.hex:i

Working directory:
${PROJECT_DIR}/${TARGET_OUTPUT_DIR}
```



Avrdude as external tool from CodeBlocks

avrdude version 6.0.1, URL: http://savannah.nongnu.org/projects/avrdude/ is used

```
avrdude-arduino.conf file listing:

# $Id: avrdude.conf.in 1236 2013-09-16 19:40:15Z joerg_wunsch $ -*- text -*-
#

# AVRDUDE Configuration File
#

# This file contains configuration data used by AVRDUDE which describes
# the programming hardware pinouts and also provides part definitions.
# AVRDUDE's "-C" command line option specifies the location of the
# configuration file. The "-c" option names the programmer configuration
# which must match one of the entry's "id" parameter. The "-p" option
# identifies which part AVRDUDE is going to be programming and must match
# one of the parts' "id" parameter.
```

```
# Possible entry formats are:
   programmer
       parent <id>
                                                    # optional parent
                = <id1> [, <id2> [, <id3>] ...] ; # <idN> are quoted strings
        id
        desc
                = <description> ;
                                                    # quoted string
                = <type>;
        type
                                                    # programmer type, quoted
string
                           # supported programmer types can be listed by "-c ?type"
        connection_type = parallel | serial | usb
#
       baudrate = <num> ;
                                                    # baudrate for avr910-
programmer
                = <num1> [, <num2> ...] ;
        vcc
                                                    # pin number(s)
       buff
                = <num1> [, <num2> ...];
                                                    # pin number(s)
        reset = <num> ;
                                                    # pin number
                = < num > ;
        sck
                                                    # pin number
#
        mosi
                = < num > ;
                                                    # pin number
#
        miso
                = < num > ;
                                                    # pin number
        errled = <num> ;
#
                                                    # pin number
       rdyled
                = <num> ;
                                                    # pin number
#
       pgmled
                = <num> ;
                                                    # pin number
#
        vfyled
                = < num > ;
                                                    # pin number
#
                = <hexnum>;
        usbvid
                                                   # USB VID (Vendor ID)
        usbpid = <hexnum>;
#
                                                    # USB PID (Product ID)
       usbdev = <interface>;
                                                    # USB interface or other device
info
                                                   # USB Vendor Name
        usbvendor = <vendorname>;
#
        usbproduct = ctname>;
                                                    # USB Product Name
#
        usbsn
                = <serialno>;
                                                    # USB Serial Number
#
         To invert a bit, use = ~ <num>, the spaces are important.
        For a pin list all pins must be inverted.
#
         A single pin can be specified as usual = \sim <num>, for lists
         specify it as follows = ~ ( <num> [, <num2> ... ] ) .
#
#
#
#
    part
#
                         = <id>;
       id
                                                  # quoted string
#
        desc
                         = <description> ;
                                                  # quoted string
#
        has_jtag
                        = <yes/no> ;
                                                 # part has JTAG i/f
#
        has_debugwire
                        = <yes/no> ;
                                                 # part has debugWire i/f
       has_pdi
                         = < yes/no> ;
                                                 # part has PDI i/f
#
                                                 # part has TPI i/f
       has tpi
                        = < yes/no> ;
#
                        = <num> ;
                                              # deprecated, use stk500_devcode
        devicecode
#
        stk500 devcode = <num> ;
                                                  # numeric
        avr910 devcode = <num> ;
#
                                                  # numeric
                        = <num> <num> ;
        signature
                                                  # signature bytes
#
        chip_erase_delay = <num> ;
                                                  # micro-seconds
#
                        = dedicated | io;
        reset
#
        retry_pulse
                        = reset | sck;
#
        pgm_enable
                        = <instruction format> ;
#
                       = <instruction format> ;
        chip_erase
        chip erase delay = <num> ;
                                                  # chip erase delay (us)
#
        # STK500 parameters (parallel programming IO lines)
#
        pagel
                                                  # pin name in hex, i.e., 0xD7
                        = <num> ;
#
                                                  # pin name in hex, i.e., 0xA0
                        = < num > ;
        bs2
#
        serial
                        = <yes/no> ;
                                                  # can use serial downloading
        parallel
                        = <yes/no/pseudo>; # can use par. programming
#
        # STK500v2 parameters, to be taken from Atmel's XML files
#
        \verb|timeout| = < num>;
#
        stabdelay
                        = < num > ;
#
                       = <num> ;
        cmdexedelay
#
                        = <num> ;
        synchloops
#
        bytedelay
                        = <num> ;
#
        pollvalue
                        = < num > ;
#
        pollindex
                        = < num > :
#
        predelay
                        = < num > ;
        postdelay
                        = < num > ;
       pollmethod
                       = <num> ;
```

```
= < num > ;
        mode
#
        delay
                         = < num > ;
#
                         = <num> ;
        blocksize
#
        readsize
                        = <num> ;
        hvspcmdexedelay = <num> ;
        \# STK500v2 HV programming parameters, from XML
#
        pp_controlstack = <num>, <num>, ...; # PP only
#
        hvsp_controlstack = <num>, <num>, ...; # HVSP only
#
       hventerstabdelay = <num>;
#
        progmodedelay = <num>;
                                                 # PP only
#
        latchcycles
                        = <num>;
#
                         = <num>;
       togglevtg
        poweroffdelay
#
                         = <num>;
#
                        = <num>;
        resetdelayms
       resetdelayus = <num>;
resetdelayus = <num>;
#
       hvleavestabdelay = <num>;
#
                      = <num>;
        resetdelay
#
        synchcycles
                         = <num>;
                                                 # HVSP only
#
        chiperasepulsewidth = <num>;
                                                 # PP only
        chiperasepolltimeout = <num>;
#
#
        chiperasetime = <num>;
                                                 # HVSP only
#
        programfusepulsewidth = <num>;
                                                 # PP only
#
        programfusepolltimeout = <num>;
#
                                                 # PP only
        programlockpulsewidth = <num>;
#
        programlockpolltimeout = <num>;
        # JTAG ICE mkII parameters, also from XML files
#
#
        allowfullpagebitstream = <yes/no> ;
#
        enablepageprogramming = <yes/no> ;
#
        idr
                         = <num> ;
                                                   # IO addr of IDR (OCD) reg.
#
                         = < num > ;
        rampz
                                                   # IO addr of RAMPZ reg.
                         = <num> ;
#
        spmcr
                                                   # mem addr of SPMC[S]R reg.
        eecr
                         = < num > ;
                                                   # mem addr of EECR req.
#
                                                   \# (only when != 0x3c)
#
                         = <yes/no> ;
                                                   # AT90S1200 part
        is at90s1200
#
                                                   # AVR32 part
        is_avr32
                         = < yes/no> ;
#
        memory <memtype>
#
#
                            = < yes/no> ;
                                                  # yes / no
           paged
#
                            = <num> ;
                                                   # bytes
            size
#
           page size
                            = < num > ;
                                                   # bytes
                          = <num> ;
#
            num pages
                                                   # numeric
           min_write_delay = <num> ;
                                                   # micro-seconds
#
           max_write_delay = <num> ;
                                                   # micro-seconds
                         = <num> ;
= <num> ;
           readback p1
                                                   # byte value
#
                                                   # byte value
           readback_p2
            pwroff_after_write = <yes/no> ;
#
                                                   # yes / no
                         = <instruction format> ;
= <instruction format> ;
#
            read
            write
           read lo
                           = <instruction format> ;
#
           read hi
                            = <instruction format> ;
#
            write lo
                            = <instruction format> ;
#
            write hi
                            = <instruction format>
#
            loadpage lo
                            = <instruction format> ;
            loadpage hi
                           = <instruction format> ;
#
                            = <instruction format> ;
            writepage
#
#
      ;
# If any of the above parameters are not specified, the default value
# of 0 is used for numerics or the empty string ("") for string
# values. If a required parameter is left empty, AVRDUDE will
# Parts can also inherit parameters from previously defined parts
# using the following syntax. In this case specified integer and
# string values override parameter values from the parent part. New
# memory definitions are added to the definitions inherited from the
#
 parent.
   part parent <id>
                                                   # quoted string
```

```
= <id>;
                                                  # quoted string
       <any set of other parameters from the list above>
 NOTES:
    * 'devicecode' is the device code used by the STK500 (see codes
       listed below)
   * Not all memory types will implement all instructions.
    * AVR Fuse bits and Lock bits are implemented as a type of memory.
    * Example memory types are:
        "flash", "eeprom", "fuse", "lfuse" (low fuse), "hfuse" (high
       fuse), "signature", "calibration", "lock"
    * The memory type specified on the avrdude command line must match
      one of the memory types defined for the specified chip.
    * The pwroff after write flag causes avrdude to attempt to
     power the device off and back on after an unsuccessful write to
      the affected memory area if VCC programmer pins are defined. If
      VCC pins are not defined for the programmer, a message
      indicating that the device needs a power-cycle is printed out.
      This flag was added to work around a problem with the
      at90s4433/2333's; see the at90s4433 errata at:
         http://www.atmel.com/dyn/resources/prod documents/doc1280.pdf
 INSTRUCTION FORMATS
     Instruction formats are specified as a comma seperated list of
     string values containing information (bit specifiers) about each
     of the 32 bits of the instruction. Bit specifiers may be one of
     the following formats:
            = the bit is always set on input as well as output
#
        '0' = the bit is always clear on input as well as output
        'x' = the bit is ignored on input and output
        'a' = the bit is an address bit, the bit-number matches this bit
               specifier's position within the current instruction byte
#
        'aN' = the bit is the Nth address bit, bit-number = N, i.e., a12
               is address bit 12 on input, a0 is address bit 0.
        'i' = the bit is an input data bit
        'o' = the bit is an output data bit
    Each instruction must be composed of 32 bit specifiers. The
     instruction specification closely follows the instruction data
    provided in Atmel's data sheets for their parts.
# See below for some examples.
# The following are STK500 part device codes to use for the
 "devicecode" field of the part. These came from Atmel's software
 section avr061.zip which accompanies the application note
# AVR061 available from:
      http://www.atmel.com/dyn/resources/prod documents/doc2525.pdf
                    0x10 /* the old one that never existed! */
#define ATTINY10
#define ATTINY11
                    0x11
#define ATTINY12
                    0x12
#define ATTINY15
                    0x13
#define ATTINY13
                    0x14
#define ATTINY22
                    0x20
#define ATTINY26
                    0x21
```

```
#define ATTINY28
                    0x22
#define ATTINY2313 0x23
#define AT90S1200
                    0x33
#define AT90S2313
                    0x40
#define AT90S2323
                    0x41
#define AT90S2333
                    0x42
#define AT90S2343
                   0x43
#define AT90S4414
                    0x50
#define AT90S4433
                    0x51
#define AT90S4434
                    0x52
#define ATMEGA48
                    0x59
#define AT90S8515
                   0x60
#define AT90S8535
                   0x61
#define AT90C8534
                    0x62
#define ATMEGA8515 0x63
#define ATMEGA8535 0x64
#define ATMEGA8
                    0x70
#define ATMEGA88
                    0x73
#define ATMEGA168
                    0x86
#define ATMEGA161
                   0x80
#define ATMEGA163
                    0x81
#define ATMEGA16
                    0×82
#define ATMEGA162
                    0x83
#define ATMEGA169
                    0x84
#define ATMEGA323
                    0x90
#define ATMEGA32
                    0x91
#define ATMEGA64
                    0xA0
#define ATMEGA103
                   0xB1
#define ATMEGA128
                    0xB2
#define AT90CAN128 0xB3
#define AT90CAN64
                    0xB3
#define AT90CAN32
                    0xB3
#define AT86RF401
                    0 \times D0
#define AT89START
                    0xE0
#define AT89S51
                       0xE0
#define AT89S52
                        0xE1
# The following table lists the devices in the original AVR910
# appnote:
# |Device |Signature | Code |
# +----+
# |tiny12 | 1E 90 05 | 0x55 |
 |tiny15 | 1E 90 06 | 0x56 |
#
 | S1200 | 1E 90 01 | 0x13 |
 | S2313 | 1E 91 01 | 0x20 |
 | S2323 | 1E 91 02 | 0x48
 | S2333 | 1E 91 05 | 0x34 |
 | S2343 | 1E 91 03 | 0x4C |
 | S4414 | 1E 92 01 | 0x28 |
 | S4433 | 1E 92 03 | 0x30
 | S4434 | 1E 92 02 | 0x6C |
 | S8515 | 1E 93 01 | 0x38
#
#
 | S8535 | 1E 93 03 | 0x68
 |mega32 | 1E 95 01 | 0x72 |
```

```
|mega83 | 1E 93 05 | 0x65
 |mega103| 1E 97 01 | 0x41
 |mega161| 1E 94 01 | 0x60
# |mega163| 1E 94 02 | 0x64 |
# Appnote AVR109 also has a table of AVR910 device codes, which
# lists:
# dev
              avr910
                       signature
                      0x1E 0x93 0x07
# ATmega8
              0x77
# ATmega8515 0x3B
                      0x1E 0x93 0x06
# ATmega8535 0x6A
                      0x1E 0x93 0x08
             0x75
# ATmega16
                      0x1E 0x94 0x03
                       0x1E 0x94 0x04
# ATmega162
             0x63
            0x66
                       0x1E 0x94 0x02
# ATmega163
# ATmega169 0x79
                      0x1E 0x94 0x05
# ATmega32
             0x7F
                     0x1E 0x95 0x02
# ATmega323 0x73
                      0x1E 0x95 0x01
# ATmega64
             0x46
                       0x1E 0x96 0x02
# ATmega128
            0x44
                       0x1E 0x97 0x02
# These codes refer to "BOOT" device codes which are apparently
# different than standard device codes, for whatever reasons
# (often one above the standard code).
# There are several extended versions of AVR910 implementations around
# in the Internet. These add the following codes (only devices that
# actually exist are listed):
# ATmega8515 0x3A
# ATmega128
            0x43
             0x45
# ATmega64
# ATtiny26
             0x5E
# ATmega8535 0x69
# ATmega32
             0x72
# ATmega16
             0x74
# ATmega8
             0x76
# ATmega169 0x78
# Overall avrdude defaults; suitable for ~/.avrduderc
                  = "lpt1";
default_parallel
                   = "com1";
default serial
# default bitclock = 2.5;
# Turn off safemode by default
#default safemode = no;
# PROGRAMMER DEFINITIONS
# http://wiring.org.co/
# Basically STK500v2 protocol, with some glue to trigger the
# bootloader.
programmer
 id = "wiring";
 desc = "Wiring";
  type = "wiring";
  connection_type = serial;
programmer
 id = "arduino";
  desc = "Arduino";
  type = "arduino";
  connection_type = serial;
# this will interface with the chips on these programmers:
```

```
# http://real.kiev.ua/old/avreal/en/adapters
# http://www.amontec.com/jtagkey.shtml, jtagkey-tiny.shtml
# http://www.olimex.com/dev/arm-usb-ocd.html, arm-usb-tiny.html
# http://www.ethernut.de/en/hardware/turtelizer/index.html
# http://elk.informatik.fh-augsburg.de/hhweb/doc/openocd/usbjtag/usbjtag.html
# http://dangerousprototypes.com/docs/FT2232_breakout board
# http://www.ftdichip.com/Products/Modules/DLPModules.htm,DLP-2232*,DLP-USB1232H
# http://flashrom.org/FT2232SPI_Programmer
# The drivers will look for a specific device and use the first one found.
# If you have mulitple devices, then look for unique information (like SN)
# And fill that in here.
# Note that the pin numbers for the main ISP signals (reset, sck,
# mosi, miso) are fixed and cannot be changed, since they must match
# the way the Multi-Protocol Synchronous Serial Engine (MPSSE) of
# these FTDI ICs has been designed.
programmer
 id
            = "avrftdi";
  desc
            = "FT2232D based generic programmer";
            = "avrftdi";
 type
  connection_type = usb;
  usbvid
            = 0x0403;
           = 0x6010;
 usbpid
 usbvendor = "";
  usbproduct = "";
  usbdev = "A";
            = "":
#ISP-signals - lower ADBUS-Nibble (default)
 reset = 3;
  sck
        = 0;
        = 1;
 mosi
 miso
        = 2;
#LED SIGNALs - higher ADBUS-Nibble
 errled = 4;
 rdyled = 5;
 pgmled = 6;
  vfyled = 7;
#Buffer Signal - ACBUS - Nibble
# buff = 8;
# This is an implementation of the above with a buffer IC (74AC244) and
# 4 LEDs directly attached, all active low.
programmer
            = "2232HIO";
  id
            = "FT2232H based generic programmer";
  desc
            = "avrftdi";
  connection_type = usb;
  usbvid
            = 0x0403;
# Note: This PID is reserved for generic H devices and
# should be programmed into the EEPROM
 usbpid = 0x8A48;
  usbpid
            = 0x6010;
            = "A";
  usbdev
  usbvendor = "";
  usbproduct = "";
 usbsn
#ISP-signals
 reset = 3;
  sck
        = 0;
       = 1;
  mosi
       = 2;
 miso
 buff
        = ~4;
#LED SIGNALs
  errled = ~ 11;
  rdyled = ~14;
  pgmled = \sim 13;
 vfyled = ~12;
```

```
#The FT4232H can be treated as FT2232H, but it has a different USB
#device ID of 0x6011.
programmer parent "avrftdi"
           = "4232h";
  id
  desc
            = "FT4232H based generic programmer";
            = 0x6011;
  usbpid
programmer
            = "jtagkey";
 id
            = "Amontec JTAGKey, JTAGKey-Tiny and JTAGKey2";
            = "avrftdi";
  type
  connection_type = usb;
           = 0x0403;
# Note: This PID is used in all JTAGKey variants
          = 0xCFF8;
  usbpid
  usbdev
            = "A";
  usbvendor = "";
  usbproduct = "";
  usbsn
           = "";
#ISP-signals => 20 - Pin connector on JTAGKey
  reset = 3; # TMS 7 violet
        = 0; # TCK 9 white
  sck
       = 1; # TDI 5 green
  mosi
        = 2; # TDO 13 orange
 buff = \sim 4;
# VTG
               VREF 1 brown with red tip
# GND
               GND 20 black
# The colors are on the 20 pin breakout cable
# from Amontec
# On the adapter you can read "O-Link". On the PCB is printed "OpenJTAG v3.1"
# You can find it as "OpenJTAG ARM JTAG USB" in the internet.
 (But there are also several projects called Open JTAG, eg.
# http://www.openjtag.org, which are completely different.)
   http://www.100ask.net/shop/english.html (website seems to be outdated)
    http://item.taobao.com/item.htm?id=1559277013
   http://www.micro4you.com/store/openjtag-arm-jtag-usb.html (schematics!)
# some other sources which call it O-Link
   http://www.andahammer.com/olink/
   http://www.developmentboard.net/31-o-link-debugger.html
   http://armwerks.com/catalog/o-link-debugger-copy/
# or just have a look at ebay ...
# It is basically the same entry as jtagkey with different usb ids.
programmer parent "jtagkey"
  id
            = "o-link";
  desc
            = "O-Link, OpenJTAG from www.100ask.net";
  usbvid
            = 0x1457;
  usbpid
            = 0x5118;
  usbvendor = "www.100ask.net";
  usbproduct = "USB<=>JTAG&RS232";
# http://wiki.openmoko.org/wiki/Debug Board v3
programmer
  id = "openmoko";
  desc = "Openmoko debug board (v3)";
  type = "avrftdi";
  usbvid
           = 0x1457;
           = 0x5118;
  usbpid
  usbdev = "A";
  usbvendor = "";
  usbproduct = "";
           = "";
  usbsn
  reset = 3; # TMS 7
        = 0; # TCK 9
  sck
  mosi = 1; # TDI 5
```

```
miso = 2; # TDO 13
# Only Rev. A boards.
# Schematic and user manual:
http://www.cs.put.poznan.pl/wswitala/download/pdf/811EVBK.pdf
programmer
  id
            = "lm3s811";
            = "Luminary Micro LM3S811 Eval Board (Rev. A)";
  desc
            = "avrftdi";
  type
  connection_type = usb;
         = 0x0403;
 usbvid
            = 0xbcd9;
 usbpid
 usbvendor = "LMI";
 usbproduct = "LM3S811 Evaluation Board";
           = "A";
           = "";
  usbsn
#ISP-signals - lower ACBUS-Nibble (default)
  reset = 3;
        = 0;
  sck
 mosi = 1;
 miso = 2;
# Enable correct buffers
 buff = 7;
programmer
 id = "avrisp";
 desc = "Atmel AVR ISP";
 type = "stk500";
  connection_type = serial;
programmer
 id = "avrispv2";
  desc = "Atmel AVR ISP V2";
 type = "stk500v2";
  connection_type = serial;
programmer
 id = "avrispmkII";
 desc = "Atmel AVR ISP mkII";
 type = "stk500v2";
 connection_type = usb;
programmer parent "avrispmkII"
 id = "avrisp2";
programmer
 id = "buspirate";
 desc = "The Bus Pirate";
 type = "buspirate";
  connection_type = serial;
programmer
  id = "buspirate bb";
  desc = "The Bus Pirate (bitbang interface, supports TPI)";
  type = "buspirate bb";
  connection_type = serial;
  # pins are bits in bitbang byte (numbers are 87654321)
  # 1|POWER|PULLUP|AUX|MOSI|CLK|MISO|CS
  reset = 1;
        = 3;
  sck
       = 4;
  mosi
        = 2;
 miso
  #vcc = 7; This is internally set independent of this setting.
```

```
# This is supposed to be the "default" STK500 entry.
# Attempts to select the correct firmware version
# by probing for it. Better use one of the entries
# below instead.
programmer
 id = "stk500";
  desc = "Atmel STK500";
 type = "stk500generic";
  connection_type = serial;
programmer
 id = "stk500v1";
  desc = "Atmel STK500 Version 1.x firmware";
 type = "stk500";
  connection_type = serial;
programmer
 id = "mib510";
  desc = "Crossbow MIB510 programming board";
 type = "stk500";
  connection_type = serial;
programmer
 id = "stk500v2";
  desc = "Atmel STK500 Version 2.x firmware";
  type = "stk500v2";
  connection type = serial;
programmer
 id = "stk500pp";
 desc = "Atmel STK500 V2 in parallel programming mode";
 type = "stk500pp";
  connection_type = serial;
programmer
 id = "stk500hvsp";
  desc = "Atmel STK500 V2 in high-voltage serial programming mode";
 type = "stk500hvsp";
 connection type = serial;
programmer
 id = "stk600";
  desc = "Atmel STK600";
 type = "stk600";
  connection_type = usb;
programmer
 id = "stk600pp";
  desc = "Atmel STK600 in parallel programming mode";
 type = "stk600pp";
  connection type = usb;
programmer
 id = "stk600hvsp";
 desc = "Atmel STK600 in high-voltage serial programming mode";
 type = "stk600hvsp";
  connection_type = usb;
programmer
```

```
= "avr910";
  desc = "Atmel Low Cost Serial Programmer";
  type = "avr910";
  connection_type = serial;
programmer
 id = "ft245r";
  desc = "FT245R Synchronous BitBang";
 type = "ftdi syncbb";
 connection type = usb;
 miso = 1; \# D1
       = 0; # D0
 sck
 mosi = 2; # D2
 reset = 4; # D4
programmer
 id = "ft232r";
  desc = "FT232R Synchronous BitBang";
 type = "ftdi_syncbb";
 connection_type = usb;
 miso = 1; # RxD
sck = 0; # RTS
mosi = 2; # TxD
 reset = 4; # DTR
# see http://www.bitwizard.nl/wiki/index.php/FTDI ATmega
programmer
 id = "bwmega";
 desc = "BitWizard ftdi atmega builtin programmer";
 type = "ftdi_syncbb";
 connection_type = usb;
 miso = 5; # DSR
sck = 6; # DCD
 mosi = 3; # CTS
 reset = 7; # RI
# see http://www.geocities.jp/arduino diecimila/bootloader/index en.html
# Note: pins are numbered from 1!
programmer
 id = "arduino-ft232r";
  desc = "Arduino: FT232R connected to ISP";
  type = "ftdi syncbb";
  connection_type = usb;
 miso = 3; # CTS X3(1)
 sck = 5; \# DSR X3(2)
 mosi = 6; \# DCD X3(3)
 reset = 7; #RI X3(4)
# website mentioned above uses this id
programmer parent "arduino-ft232r"
       = "diecimila";
 id
  desc = "alias for arduino-ft232r";
programmer
 id = "usbasp";
  desc = "USBasp, http://www.fischl.de/usbasp/";
  type = "usbasp";
  connection_type = usb;
  usbvid = 0 \times 16C0; # VOTI
            = 0x05DC; # Obdev's free shared PID
  usbpid
 usbvendor = "www.fischl.de";
  usbproduct = "USBasp";
  # following variants are autodetected for id "usbasp"
```

```
# original usbasp from fischl.de
  # see above "usbasp"
  # old usbasp from fischl.de
  \#usbvid = 0x03EB; \#ATMEL
  #usbpid
             = 0xC7B4; # (unoffical) USBasp
  #usbvendor = "www.fischl.de";
  #usbproduct = "USBasp";
  # NIBObee (only if -P nibobee is given on command line)
  # see below "nibobee"
programmer
  id = "nibobee";
  desc = "NIBObee";
  type = "usbasp";
  connection_type = usb;
 usbvid = 0x16C0; # VOTI
usbpid = 0x092F; # NIBObee PID
 usbpid
 usbvendor = "www.nicai-systems.com";
 usbproduct = "NIBObee";
programmer
 id = "usbasp-clone";
  desc = "Any usbasp clone with correct VID/PID";
  type = "usbasp";
  connection type = usb;
  usbvid = 0x16C0; # VOTI
usbpid = 0x05DC; # Obdev's free shared PID
 usbpid
 #usbvendor = "";
  #usbproduct = "";
programmer
 id = "usbtiny";
  desc = "USBtiny simple USB programmer, http://www.ladyada.net/make/usbtinyisp/";
  type = "usbtiny";
  connection_type = usb;
 usbvid = 0x1781;
usbpid = 0x0c9f;
programmer
 id = "arduinoisp";
 desc = " ";
 type = "usbtiny";
 connection_type = usb;
 usbvid = 0x2341;
usbpid = 0x0049;
programmer
 id = "butterfly";
  desc = "Atmel Butterfly Development Board";
  type = "butterfly";
 connection type = serial;
programmer
 id = "avr109";
 desc = "Atmel AppNote AVR109 Boot Loader";
 type = "butterfly";
  connection_type = serial;
programmer
  id = "avr911";
```

```
desc = "Atmel AppNote AVR911 AVROSP";
  type = "butterfly";
  connection_type = serial;
# suggested in http://forum.mikrokopter.de/topic-post48317.html
programmer
 id = "mkbutterfly";
  desc = "Mikrokopter.de Butterfly";
 type = "butterfly_mk";
 connection_type = serial;
programmer parent "mkbutterfly"
id = "butterfly mk";
programmer
 id = "jtagmkI";
 desc = "Atmel JTAG ICE (mkI)";
 baudrate = 115200;
                      # default is 115200
 type = "jtagmki";
 connection_type = serial;
# easier to type
programmer parent "jtagmkI"
 id = "jtag1";
# easier to type
programmer parent "jtag1"
 id = "jtag1slow";
 baudrate = 19200;
# The JTAG ICE mkII has both, serial and USB connectivity. As it is
# mostly used through USB these days (AVR Studio 5 only supporting it
# that way), we make connection_type = usb the default. Users are
# still free to use a serial port with the -P option.
programmer
 id = "jtagmkII";
 desc = "Atmel JTAG ICE mkII";
 baudrate = 19200;
                      # default is 19200
 type = "jtagmkii";
  connection_type = usb;
# easier to type
programmer parent "jtagmkII"
     = "jtag2slow";
 id
# JTAG ICE mkII @ 115200 Bd
programmer parent "jtag2slow"
 id = "jtag2fast";
 baudrate = 115200;
# make the fast one the default, people will love that
programmer parent "jtag2fast"
 id = "jtag2";
# JTAG ICE mkII in ISP mode
programmer
  id = "jtag2isp";
  desc = "Atmel JTAG ICE mkII in ISP mode";
 baudrate = 115200;
```

```
type = "jtagmkii isp";
  connection type = usb;
# JTAG ICE mkII in debugWire mode
programmer
 id = "jtag2dw";
  desc = "Atmel JTAG ICE mkII in debugWire mode";
 baudrate = 115200;
 type = "jtagmkii dw";
 connection type = usb;
# JTAG ICE mkII in AVR32 mode
programmer
 id = "jtagmkII avr32";
 desc = "Atmel JTAG ICE mkII im AVR32 mode";
 baudrate = 115200;
 type = "jtagmkii_avr32";
  connection_type = usb;
# JTAG ICE mkII in AVR32 mode
programmer
 id = "jtag2avr32";
 desc = "Atmel JTAG ICE mkII im AVR32 mode";
 baudrate = 115200;
 type = "jtagmkii_avr32";
  connection_type = usb;
# JTAG ICE mkII in PDI mode
programmer
       = "jtag2pdi";
 id
 desc = "Atmel JTAG ICE mkII PDI mode";
 baudrate = 115200;
 type = "jtagmkii pdi";
 connection_type = usb;
# AVR Dragon in JTAG mode
programmer
 id = "dragon jtag";
 desc = "Atmel AVR Dragon in JTAG mode";
 baudrate = 115200;
 type = "dragon_jtag";
  connection_type = usb;
# AVR Dragon in ISP mode
programmer
 id = "dragon_isp";
 desc = "Atmel AVR Dragon in ISP mode";
 baudrate = 115200;
 type = "dragon_isp";
 connection_type = usb;
# AVR Dragon in PP mode
programmer
 id = "dragon_pp";
  desc = "Atmel AVR Dragon in PP mode";
 baudrate = 115200;
 type = "dragon_pp";
  connection type = usb;
# AVR Dragon in HVSP mode
programmer
  id = "dragon hvsp";
```

```
desc = "Atmel AVR Dragon in HVSP mode";
 baudrate = 115200;
  type = "dragon hvsp";
  connection_type = usb;
# AVR Dragon in debugWire mode
programmer
 id = "dragon dw";
 desc = "Atmel AVR Dragon in debugWire mode";
 baudrate = 115200;
 type = "dragon_dw";
 connection type = usb;
# AVR Dragon in PDI mode
programmer
 id = "dragon_pdi";
desc = "Atmel AVR Dragon in PDI mode";
 baudrate = 115200;
 type = "dragon pdi";
 connection_type = usb;
programmer
 id = "jtag3";
 desc = "Atmel AVR JTAGICE3 in JTAG mode";
 type = "jtagice3";
 connection_type = usb;
programmer
 id = "jtag3pdi";
 desc = "Atmel AVR JTAGICE3 in PDI mode";
 type = "jtagice3_pdi";
  connection_type = usb;
programmer
 id = "jtag3dw";
  desc = "Atmel AVR JTAGICE3 in debugWIRE mode";
  type = "jtagice3 dw";
  connection_type = usb;
programmer
 id = "jtag3isp";
 desc = "Atmel AVR JTAGICE3 in ISP mode";
 type = "jtagice3_isp";
 connection_type = usb;
programmer
 id = "pavr";
 desc = "Jason Kyle's pAVR Serial Programmer";
 type = "avr910";
  connection_type = serial;
programmer
 id = "pickit2";
  desc = "MicroChip's PICkit2 Programmer";
 type = "pickit2";
  connection_type = usb;
# Parallel port programmers.
programmer
```

```
= "bsd":
  id
  desc = "Brian Dean's Programmer, http://www.bsdhome.com/avrdude/";
  type = "par";
  connection_type = parallel;
 vcc = 2, 3, 4, 5;
 reset = 7;
 sck = 8;
 mosi = 9;
 miso = 10;
programmer
 id = "stk200";
  desc = "STK200";
  type = "par";
  connection type = parallel;
 buff = 4, 5;
 sck = 6;
mosi = 7;
 reset = 9;
 miso = 10;
# The programming dongle used by the popular Ponyprog
# utility. It is almost similar to the STK200 one,
# except that there is a LED indicating that the
# programming is currently in progress.
programmer parent "stk200"
 id = "pony-stk200";
  desc = "Pony Prog STK200";
 pgmled = 8;
programmer
 id = "dt006";
 desc = "Dontronics DT006";
 type = "par";
 connection_type = parallel;
 reset = 4;
  sck = 5;
 mosi = 2;
 miso = 11;
programmer parent "dt006"
 id = "bascom";
 desc = "Bascom SAMPLE programming cable";
programmer
 id = "alf";
  desc = "Nightshade ALF-PgmAVR, http://nightshade.homeip.net/";
 type = "par";
  connection_type = parallel;
 vcc = 2, 3, 4, 5;
buff = 6;
 buff
  reset = 7;
        = 8;
 sck
 mosi = 9;
        = 10;
 miso
 errled = 1;
 rdyled = 14;
 pgmled = 16;
  vfyled = 17;
programmer
 id = "sp12";
  desc = "Steve Bolt's Programmer";
```

```
type = "par";
  connection_type = parallel;
  vcc = 4, \overline{5}, 6, 7, 8;
 reset = 3;
 sck = 2;
 mosi = 9;
 miso = 11;
programmer
 id = "picoweb";
       = "Picoweb Programming Cable, http://www.picoweb.net/";
= "par";
  desc
  type
  connection_type = parallel;
 reset = 2;
 sck
        = 3;
       = 4;
 mosi
 miso = 13;
programmer
 id = "abcmini";
  desc = "ABCmini Board, aka Dick Smith HOTCHIP";
 type = "par";
  connection_type = parallel;
 reset = 4;
 sck = 3;
 mosi = 2;
 miso = 10;
programmer
 id = "futurlec";
  desc = "Futurlec.com programming cable.";
  type = "par";
  connection_type = parallel;
 reset = 3;
 sck = 2;
 mosi = 1;
 miso = 10;
# From the contributor of the "xil" jtag cable:
# The "vcc" definition isn't really vcc (the cable gets its power from
# the programming circuit) but is necessary to switch one of the
# buffer lines (trying to add it to the "buff" lines doesn't work in
# avrdude versions before 5.5j).
# With this, TMS connects to RESET, TDI to MOSI, TDO to MISO and TCK
# to SCK (plus vcc/gnd of course)
programmer
 id = "xil";
  desc = "Xilinx JTAG cable";
 type = "par";
  connection_type = parallel;
 mosi = 2;
  sck
       = 3;
  reset = 4;
 buff = 5;
 miso = 13;
  vcc = 6;
programmer
 id = "dapa";
  desc = "Direct AVR Parallel Access cable";
  type = "par";
  connection_type = parallel;
  vcc = 3;
```

```
reset = 16:
  sck = 1;
 mosi = 2;
 miso = 11;
programmer
 id = "atisp";
  desc = "AT-ISP V1.1 programming cable for AVR-SDK1 from <a href="http://micro-</a>
research.co.th/> micro-research.co.th";
 type = "par";
  connection_type = parallel;
 reset = ~6;
  sck = ~8;
 mosi = ~7;
 miso = \sim 10;
programmer
 id = "ere-isp-avr";
  desc = "ERE ISP-AVR <http://www.ere.co.th/download/sch050713.pdf>";
  type = "par";
  connection_type = parallel;
 reset = ~4;
  sck = 3;
 mosi = 2;
 miso = 10;
programmer
 id = "blaster";
  desc = "Altera ByteBlaster";
  type = "par";
 connection_type = parallel;
 sck = 2;
 miso = 11;
 reset = 3;
 mosi = 8;
 buff = 14;
# It is almost same as pony-stk200, except vcc on pin 5 to auto
# disconnect port (download on http://electropol.free.fr/spip/spip.php?article27)
programmer parent "pony-stk200"
       = "frank-stk200";
  desc = "Frank STK200";
 buff = ; # delete buff pin assignment
  vcc = 5;
# The AT98ISP Cable is a simple parallel dongle for AT89 family.
# http://www.atmel.com/dyn/products/tools_card.asp?tool_id=2877
programmer
 id = "89isp";
  desc = "Atmel at89isp cable";
  type = "par";
  connection_type = parallel;
  reset = 17;
 sck = 1;
 mosi = 2;
 miso = 10;
#This programmer bitbangs GPIO lines using the Linux sysfs GPIO interface
#To enable it set the configuration below to match the GPIO lines connected to the
#relevant ISP header pins and uncomment the entry definition. In case you don't
#have the required permissions to edit this system wide config file put the
#entry in a separate <your name>.conf file and use it with -C+<your name>.conf
```

```
#on the command line.
#To check if your avrdude build has support for the linuxgpio programmer compiled
#use -c?type on the command line and look for linuxgpio in the list. If it's not
available
#you need pass the --enable-linuxgpio=yes option to configure and recompile
avrdude.
#programmer
# id = "linuxgpio";
  desc = "Use the Linux sysfs interface to bitbang GPIO lines";
  type = "linuxgpio";
 reset = ?;
 sck = ?;
 mosi = ?;
 miso = ?;
#;
# some ultra cheap programmers use bitbanging on the
# serialport.
# PC - DB9 - Pins for RS232:
# GND
        5
            -- 10
                   01 <-
                           9
                               RI
               - 1
# DTR
            <- |0
                   0| <-
                           8
                               CTS
 TXD
        3
            <- 10
                   0| ->
                           7
                               RTS
            -> 10
        2
# RXD
                   0| <-
                           6
                               DSR
# DCD
        1
            -> |0
# Using RXD is currently not supported.
# Using RI is not supported under Win32 but is supported under Posix.
# serial ponyprog design (dasa2 in uisp)
# reset=!txd sck=rts mosi=dtr miso=cts
programmer
 id = "ponyser";
 desc = "design ponyprog serial, reset=!txd sck=rts mosi=dtr miso=cts";
 type = "serbb";
 connection_type = serial;
 reset = ~3;
 sck = 7;
 mosi = 4;
 miso = 8;
# Same as above, different name
# reset=!txd sck=rts mosi=dtr miso=cts
programmer parent "ponyser"
 id = "siprog";
  desc = "Lancos SI-Prog <a href="http://www.lancos.com/siprogsch.html">http://www.lancos.com/siprogsch.html</a>;
# unknown (dasa in uisp)
# reset=rts sck=dtr mosi=txd miso=cts
programmer
 id = "dasa";
  desc = "serial port banging, reset=rts sck=dtr mosi=txd miso=cts";
  type = "serbb";
  connection_type = serial;
  reset = 7;
  sck = 4;
  mosi = 3;
```

```
miso = 8;
# unknown (dasa3 in uisp)
# reset=!dtr sck=rts mosi=txd miso=cts
programmer
 id = "dasa3";
 desc = "serial port banging, reset=!dtr sck=rts mosi=txd miso=cts";
 type = "serbb";
 connection_type = serial;
 reset = ~4;
 sck = 7;
 mosi = 3;
 miso = 8;
# C2N232i (jumper configuration "auto")
# reset=dtr sck=!rts mosi=!txd miso=!cts
programmer
 id = "c2n232i";
 desc = "serial port banging, reset=dtr sck=!rts mosi=!txd miso=!cts";
 type = "serbb";
  connection_type = serial;
 reset = 4;
 sck = ~7;
 mosi = ~3;
 miso = \sim 8;
# PART DEFINITIONS
              _____
# ATtiny11
#------
# This is an HVSP-only device.
part
   id
                      = "t11";
                     = "ATtiny11";
   desc
                     = 0x11;
   stk500 devcode
   signature
                      = 0x1e 0x90 0x04;
                     = 20000;
   chip_erase_delay
   timeout
                  = 200;
   hvsp_controlstack
       Ox4C, 0x0C, 0x1C, 0x2C, 0x3C, 0x64, 0x74, 0x00, 0x68, 0x78, 0x68, 0x68, 0x00, 0x00, 0x68, 0x78,
       0x78, 0x00, 0x6D, 0x0C, 0x80, 0x40, 0x20, 0x10,
       0x11, 0x08, 0x04, 0x02, 0x03, 0x08, 0x04, 0x00;
   hventerstabdelay = 100;
   progmodedelay
                      = 0;
   hvspcmdexedelay
                      = 0;
                     = 6;
   synchcycles
                     = 1;
   latchcycles
   togglevtg
                     = 1;
                      = 25;
   poweroffdelay
   resetdelayms
                      = 0;
                      = 50;
   resetdelayus
   hvleavestabdelay
                    = 100;
= 25;
   resetdelay
   chiperasepolltimeout = 40;
   chiperasetime
                   = 0;
   programfusepolltimeout = 25;
   programlockpolltimeout = 25;
```

```
memory "eeprom"
       size = blocksize = 64; readsize = 256;
                         = 64;
                     = 5;
       delay
    memory "flash"
                      = 1024;
     size = 1
blocksize = 128;
readsize = 256;
delay = 3:
       delay
                     = 3;
    memory "signature"
                          = 3;
        size
    memory "lock"
                         = 1;
     size
    memory "calibration"
    memory "fuse"
                         = 1;
       size
# ATtiny12
part
                         = "t12";
    id
    = 0x1e 0x90 0x05;
    signature
    signature
chip_erase_delay = 20000;
pgm enable = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
                            "x x x x x x x x x x x x x x x x x x ";
                           = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
    chip_erase
                             "x x x x x x x x x x x x x x x x";
                      = 200;
    timeout
    stabdelay = 200;
    cmdexedelay
                             = 25;
    synchloops
                              = 32;
    bytedelay
                      = 0;
    pollindex
                      = 3;
                      = 0x53;
    pollvalue
    predelay
                      = 1;
    postdelay
                      = 1;
                             = 0;
    pollmethod
    hvsp controlstack
         0x4C, 0x0C, 0x1C, 0x2C, 0x3C, 0x64, 0x74, 0x00, 0x68, 0x78, 0x68, 0x68, 0x00, 0x00, 0x68, 0x78, 0x78, 0x00, 0x6D, 0x0C, 0x80, 0x40, 0x20, 0x10, 0x11, 0x08, 0x04, 0x02, 0x03, 0x08, 0x04, 0x00;
    hventerstabdelay = 100;
                         = 0;
    hvspcmdexedelay
    synchcycles = 6;
latchcycles = 1;
    latchcycles
                         = 1;
    togglevtg
    poweroffdelay = 25;
```

```
= 0;
resetdelayms
               = 0;
= 50;
= 100;
resetdelayus
hvleavestabdelay
resetdelay
                 = 25;
chiperasepolltimeout = 40;
chiperasetime = 0;
programfusepolltimeout = 25;
programlockpolltimeout = 25;
memory "eeprom"
   size
                  = 64;
   min_write_delay = 9000;
   max write delay = 20000;
                = 0xff;
= 0xff;
   readback_p1
   readback_p2
   read
                  = "1 0 1 0 0 0 0 0 xxxx xxxx",
                   = "1 1 0 0
                                0 0 0 0
   write
                                              x x x x x x x x",
                   "x x a5 a4 a3 a2 a1 a0 iiii iiii";
              = 0x04;
  mode
              = 8;
  delay
  blocksize
              = 64;
             = 256;
  readsize
memory "flash"
   size
                 = 1024;
   min write delay = 4500;
   max write delay = 20000;
   readback_p1 = 0xff;
                  = 0xff;
   readback_p2
                  = " 0 0 1 0 0 0 0 0",

" x x x x x x x x a8",

" a7 a6 a5 a4 a3 a2 a1 a0",
   read lo
                    " 0 0 0 0
                                  0 0 0 0";
                  = " 0 0 1 0
                                  1 0 0 0",
   read hi
                    " x x x x
                                  х х х а8",
                    " a7 a6 a5 a4
                                  a3 a2 a1 a0",
                    " 0 0 0 0
                                  0 0 0 0";
                  = " 0 1 0 0 0 0 0 0",
   write lo
                    " x x x x x x x x a8",
" a7 a6 a5 a4 a3 a2 a1 a0",
                    " i i i i
                                 i i i i";
                  = " 0 1 0 0 1 0 0 0",
   write_hi
                    " x x x x x x x x a8",
" a7 a6 a5 a4 a3 a2 a1 a0",
" i i i i i i i i i;;
              = 0x04;
              = 5;
  delay
  blocksize
              = 128;
  readsize
              = 256;
memory "signature"
                  = 3;
  size
                  read
                                              x x x x x x x x",
                                              00000000";
memory "lock"
   size
                  = 1;
                  = "0 1 0 1
   read
                                 1 0 0 0
                                              x x x x x x x x x,
                    "x x x x
                                x x x x
                                              x x x x x o o x";
```

```
= "1 0 1 0
                                       1 1 0 0
                                                      11111ii1",
                          "x x x x x x x x
                                                      x x x x x x x x";
        min write delay = 9000;
       max_write_delay = 9000;
    memory "calibration"
        size
                       = 1;
                       = "0 0 1 1 1 0 0 0 xxxx xxxx",
        read
                         memory "fuse"
                       = 1;
       size
                        = "0 1 0 1
        read
                                        0 0 0 0
                                                     xxxx xxxx".
                         "x x x x
                                                      0000 0000";
                                      = "1 0 1 0
                                                     1 0 1 x x x x x",
i i i i i i i i i;;
        write
                        "x x x x x x x x x = 9000.
                                       1 1 0 0
       min_write_delay = 9000;
       max_write_delay = 9000;
# ATtiny13
part
   id
                       = "t13";
                      = "ATtiny13";
    desc
    has debugwire = yes;
    flash instr = 0xB4, 0x0E, 0x1E;
     eeprom_instr = 0xBB, 0xFE, 0xBB, 0xEE, 0xBB, 0xCC, 0xB2, 0x0D,
                   0xBC, 0x0E, 0xB4, 0x0E, 0xBA, 0x0D, 0xBB, 0xBC, 0x99, 0xE1, 0xBB, 0xAC;
    stk500 devcode = 0x14;
    signature
                      = 0x1e 0x90 0x07;
    chip_erase_delay
                       = 4000;
   pgm enable
                       = "1 0 1 0 1 1 0 0
                                             0 1 0 1 0 0 1 1",
                         "x x x x x x x x x x x x x x x x";
                       = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
    chip_erase
                         "x x x x x x x x x x x x x x x x";
                   = 200;
    timeout
    stabdelay
                    = 100;
    cmdexedelay
                          = 25;
    synchloops
                          = 32;
    bytedelay
                   = 0;
    pollindex
                   = 3;
    pollvalue
                   = 0x53;
                   = 1;
    predelay
                   = 1;
    postdelay
    pollmethod
                          = 1:
    hvsp controlstack
      0x4C, 0x0C, 0x1C, 0x2C, 0x3C, 0x64, 0x74, 0x66,
        0x68, 0x78, 0x68, 0x68, 0x7A, 0x6A, 0x68, 0x78,
        0 \\ \mathbf{x} \\ 78 \,,\ 0 \\ \mathbf{x} \\ 7D \,,\ 0 \\ \mathbf{x} \\ 6D \,,\ 0 \\ \mathbf{x} \\ 0C \,,\ 0 \\ \mathbf{x} \\ 80 \,,\ 0 \\ \mathbf{x} \\ 40 \,,\ 0 \\ \mathbf{x} \\ 20 \,,\ 0 \\ \mathbf{x} \\ 10 \,,
        0x11, 0x08, 0x04, 0x02, 0x03, 0x08, 0x04, 0x00;
    hventerstabdelay = 100;
                       = 0;
    progmodedelay
    hvspcmdexedelay = 0;
    synchcycles
                      = 6;
                      = 1;
    latchcycles
    togglevtg
                       = 1;
    poweroffdelay
                       = 25;
    resetdelayms
                       = 0:
    resetdelayus
                      = 90;
```

```
= 100;
hvleavestabdelay
resetdelay
                = 25;
chiperasepolltimeout = 40;
chiperasetime = 0;
programfusepolltimeout = 25;
programlockpolltimeout = 25;
ocdrev
                 = 0;
memory "eeprom"
  size
                 = 64;
   page_size
                = 4;
   min write delay = 4000;
   max_write_delay = 4000;
               = 0xff;
   readback p1
   readback p2
                = 0xff;
                 = "1 0 1 0 0 0 0 0
                                          0 0 0 x x x x x",
   read
                  "x x a5 a4 a3 a2 a1 a0
                                          0000 0000";
                                          0 0 0 x x x x x",
                 = "1 1 0 0
                             0 0 0 0
   write
                  "x x a5 a4 a3 a2 a1 a0
                                        iiii iiii";
             = " 1
                     1
                        0
                            0
                                  0
                                     0
                                         0
                                            1",
  loadpage_lo
                0
               11
                     0
                         0
                            0
                                  0
                                     0
                                        0
                                            0",
                 0
                                           a0",
                                        a1
                     0
                        0
                            0
                                  0
                                     0
               " i
                    i
                        i
                            i
                                  i
                                    i
                                        i
                                           i";
             = " 1
                            0
                                            0",
                     1
                        O
                                 Ω
                                     0
                                         1
  writepage
                 0
                     0
                        х
                                 x
                                     х
                                            x",
                           х
                                        х
                                 a3 a2
               " x
                     x a5 a4
                                         0
                                            0",
               " x
                                    x x x";
                                 х
                     x
                        х
                           x
  mode
             = 0x41;
             = 5;
  delay
  blocksize
             = 4;
            = 256;
  readsize
memory "flash"
  paged
                = yes;
   size
                = 1024;
   page_size
                = 32;
                = 32;
   num pages
   min_write_delay = 4500;
   max_write_delay = 4500;
               = 0xff;
   readback p1
                 = 0xff;
   readback_p2
                 = " 0 0 1 0 0 0 0 0",
   read lo
                  " 0 0 0 0 0 0 0 a8",
                  " a7 a6 a5 a4 a3 a2 a1 a0",
                     0 0 0 0
                                0 0 0 0";
                 = " 0 0 1 0
                                1 0 0 0",
   read hi
                  " 0 0 0 0
                              0 0 0 a8",
                  " a7 a6 a5 a4 a3 a2 a1 a0",
                     0 0 0 0
                               0 0 0 0";
                 = " 0 1 0 0
                               0 0 0 0",
   loadpage_lo
                  " 0 0 0 x x x x x",
                  11
                    iiii
                               i i i i";
                 = " 0 1 0 0
                                1 0 0 0",
   loadpage_hi
                              x x x x",
                  " 0 0 0 x
                  11
                     x x x x a3 a2 a1 a0",
                     i i i i
                               i i i i";
                 = " 0 1 0 0
                                1 1 0 0",
   writepage
                  " 0 0 0 0
                                0 0 0 a8",
                  " a7 a6 a5 a4
                                x x x x",
```

```
" x x x x x x x x";
               = 0x41;
     mode
    delay
              = 6;
    blocksize = 32;
     readsize
              = 256;
   memory "signature"
     size
                  = 3;
                  = "0 0 1 1 0 0 0 0 0 0 x x x x x",
      read
                   memory "lock"
     size
                 = 1;
     min write delay = 4500;
     max write delay = 4500;
                 read
                    "x x x x x x x x x x x 0 0 0 0 0 0";
                  = "1 0 1 0 1 1 0 0 111 x x x x x",
"x x x x x x x x x x x 11ii iiii;";
      write
                              x x x x
                    "x x x x
   memory "calibration"
     size = 2;
                  = "0 0 1 1 1 0 0 0
"0 0 0 0 0 0 0 0 a0
      read
                                          0 0 0 x x x x x",
                                          0000 0000";
   memory "lfuse"
     size
                  = 1;
      min write delay = 4500;
      max write delay = 4500;
                  = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
      write
                    "x x x x x x x x i i i i i i i i;
                  = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
      read
                   "x x x x x x x x 0 0 0 0 0 0 0 0";
   memory "hfuse"
     size = 1;
     min write delay = 4500;
     max write delay = 4500;
      write
                  "x x x x x x x x i i i i i i i i;
                  = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
      read
                   "x x x x x x x x 0 0 0 0 0 0 0 0";
;
# ATtiny15
part
  id
                 = "t15";
   chip_erase_delay = 8200;
```

```
= "1 0 1 0 1 1 0 0
                                           0 1 0 1 0 0 1 1",
pgm_enable
                      "x x x x x x x x
                                          x x x x x x x x x ";
chip_erase
                    = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
                      "x x x x x x x x x x x x x x x x";
                = 200;
timeout
stabdelay
                = 100;
cmdexedelay
                       = 25:
synchloops
                       = 32;
bytedelay
                = 0;
pollindex
                = 3;
                = 0x53;
pollvalue
                = 1;
predelay
postdelay
                = 1;
pollmethod
                       = 0;
hvsp controlstack
    0x4C, 0x0C, 0x1C, 0x2C, 0x3C, 0x64, 0x74, 0x00,
    0x68, 0x78, 0x68, 0x68, 0x00, 0x00, 0x68, 0x78,
    0 \\ \mathbf{x} \\ 78 \,,\ 0 \\ \mathbf{x} \\ 00 \,,\ 0 \\ \mathbf{x} \\ 6D \,,\ 0 \\ \mathbf{x} \\ 0C \,,\ 0 \\ \mathbf{x} \\ 80 \,,\ 0 \\ \mathbf{x} \\ 40 \,,\ 0 \\ \mathbf{x} \\ 20 \,,\ 0 \\ \mathbf{x} \\ 10 \,,
    0x11, 0x08, 0x04, 0x02, 0x03, 0x08, 0x04, 0x00;
hventerstabdelay = 100;
hvspcmdexedelay
                   = 5;
                    = 6;
synchcycles
latchcycles
                   = 16;
togglevtg
                   = 1;
                   = 25;
poweroffdelay
resetdelayms
resetdelayus
                    = 0;
                    = 50;
hvleavestabdelay = 100;
resetdelay = 25;
chiperasepolltimeout = 40;
chiperasetime = 0;
programfusepolltimeout = 25;
programlockpolltimeout = 25;
memory "eeprom"
                    = 64:
   size
    min write delay = 8200;
    max write delay = 8200;
                   = 0xff;
    readback_p1
                    = 0xff;
    readback_p2
                    read
                      = "1 1 0 0 0 0 0 0 xxxx xxxx",
    write
                      "x x a5 a4 a3 a2 a1 a0 iiii iiii";
                = 0x04;
  mode
  delay
                = 10;
               = 64;
  blocksize
  readsize
               = 256;
memory "flash"
                    = 1024;
    size
   min write delay = 4100;
   max_write_delay = 4100;
                  = 0xff;
   readback p1
                    = 0xff;
    readback_p2
                    = " 0 0 1 0 0 0 0 0",
" x x x x x x x x x 8",
    read lo
                      " a7 a6 a5 a4 a3 a2 a1 a0",
                      " 0 0 0 0
                                     0 0 0 0";
    read hi
                    = " 0 0 1 0
                                      1 0 0 0",
                      " x x x x
                                      х х х а8",
                      " a7 a6 a5 a4 a3 a2 a1 a0",
                      " 0 0 0 0
                                     0 0 0 0";
```

```
= " 0 1 0 0 0 0 0 0",
      write lo
                    " x x x x
                                х х х а8",
                    " a7 a6 a5 a4 a3 a2 a1 a0",
                    " i i i i i i i";
      write_hi
                  = " 0 1 0 0
                                 1 0 0 0",
                    " x x x x
                                х х х а8",
                    " a7 a6 a5 a4 a3 a2 a1 a0",
                    " i i i i i i i";
               = 0x04;
     mode
               = 5;
     delay
               = 128;
     blocksize
     readsize
              = 256;
   memory "signature"
      size
                  = 3;
                  = "0 0 1 1 0 0 0 0 xxxx xxxx",
      read
                   "0 0 0 0 0 0 al a0 0000 000";
   memory "lock"
                  = 1;
     size
                  = "0 1 0 1 1 0 0 0
      read
                                          xxxx xxxx",
                    "x x x x
                              x x x x x x x x x o o x";
      write
                   = "1 0 1 0
                               1 1 0 0
                                          1111 1 i i 1",
                    "x x x x x x x x
                                          xxxx xxxx";
     min write delay = 9000;
     max write delay = 9000;
   memory "calibration"
                  = 1;
     size
                  = "0 0 1 1 1 0 0 0 xxxx xxxx",
      read
                   "0 0 0 0 0 0 0
                                          0000 0000";
   memory "fuse"
                  = 1;
     size
                   = "0 1 0 1
                               0 0 0 0
      read
                                          x x x x x x x x x ",
                    "x x x x
                               x x x x
                                          0000 x x 00";
                   = "1 0 1 0 1 1 0 0 101x x x x x",
"x x x x x x x x x iiii 11ii";
                   = "1 0 1 0 1 1 0 0
      min_write_delay = 9000;
      max_write_delay = 9000;
;
#-----
#-----
part
                = "1200";
   id
               = "AT90S1200";
   desc
   is at90s1200 = yes;
   stk500_devcode = 0x33;
avr910_devcode = 0x13;
   signature
                = 0x1e 0x90 0x01;
   pagel
               = 0xd7;
   bs2
                = 0xa0;
   chip_erase_delay = 20000;
                                0 1 0 1 0 0 1 1",
xxxx x x x x x;
   pgm_enable = "1 0 1 0 1 1 0 0
                  "x x x x x x x x
   chip_erase = "1 0 1 0 1 1 0 0 1 0 0 0 0 0 0",
```

```
"x x x x x x x x
                                       x x x x x x x x";
timeout
               = 200;
stabdelay
               = 100;
                      = 25;
cmdexedelay
synchloops
                      = 1;
bytedelay
               = 0;
pollindex
               = 0;
               = 0xFF;
pollvalue
predelay
               = 1;
postdelay
               = 1;
                      = 0;
pollmethod
pp_controlstack
    0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
    {\tt 0x4E,\ 0x5E,\ 0x4F,\ 0x5F,\ 0x6E,\ 0x7E,\ 0x6F,\ 0x7F,}
   0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
hventerstabdelay = 100;
                   = 0;
progmodedelay
latchcycles
                  = 0;
togglevtg
                  = 0;
poweroffdelay
                   = 0;
                   = 0;
resetdelayms
resetdelayus
                   = 0;
                 = 15;
hvleavestabdelay
chiperasepulsewidth = 15;
chiperasepolltimeout = 0;
programfusepulsewidth = 2;
programfusepolltimeout = 0;
programlockpulsewidth = 0;
programlockpolltimeout = 1;
memory "eeprom"
   size
                   = 64;
   min write delay = 4000;
   max_write_delay = 9000;
                 = 0x00;
   readback_p1
   readback_p2
                   = 0xff;
    read
                   = "1 0 1 0
                                 0 0 0 0
                                              xxxx xxxx",
                     "x x a5 a4 a3 a2 a1 a0
                                              0000 0000";
                   = "1 1 0 0
                                 0 0 0 0
    write
                                             xxxx xxxx",
                     "x x a5 a4 a3 a2 a1 a0 iiii iiii";
               = 0x04;
  mode
               = 20;
  delay
  blocksize
               = 32;
  readsize
              = 256;
memory "flash"
   size
                   = 1024;
   min write delay = 4000;
   max_write_delay = 9000;
   readback_p1
                   = 0xff;
   readback_p2
                   = 0xff;
    read lo
                   = " 0
                            0
                                1
                                    0
                                         0
                                           0
                                                 0
                                                     0",
                     " x
                                           x
                                                ж а8",
                                   х
                           х
                               х
                                         х
                     " a7 a6 a5 a4
                                        a3 a2 a1
                                                    a0",
                     " 0
                                                     o";
                                0
                                         0
                   = " 0
                            0
                                    0
                                         1
                                             0
                                                 0
                                                     0",
    read hi
                                1
                     " x
                                            x
                                                   a8",
                            x
                                x
                                    х
                                         x
                                                 x
                     " a7 a6 a5 a4
                                        a3 a2 a1 a0",
                                0
                                         0
                                                     0";
                   = " 0
                            1
                                0
                                    0
                                         0
                                             0
                                                 0
                                                     0",
    write lo
                     " x
                            x
                                х
                                    х
                                         x
                                            x
                                                x
                                                   a8",
                     " a7
                                        a3 a2 a1 a0",
                               a5 a4
                           a6
                     " i
                            i
                                i
                                    i
                                        i
                                            i
                                                i
                                                     i";
```

```
= " 0
                             1
                                0
                                    0
                                            0
                                                0
                                                   0",
       write hi
                                        1
                       " x
                                        х х
                                               ж а8",
                             x
                                х
                                    x
                       " a7 a6 a5 a4 a3 a2 a1 a0",
                       " i i i i i i i";
     mode
                 = 0x02;
      delay
                 = 15;
                 = 128;
     blocksize
     readsize
                = 256;
   memory "signature"
                     = 3;
      size
                     = "0 0 1 1 0 0 0 0
       read
                                              x x x x x x x x",
                      "x x x x
                                  x x a1 a0 o o o o o o o";
   memory "fuse"
                     = 1;
     size
   memory "lock"
                    = 1;
      size
      min_write_delay = 9000;
      max_write_delay = 20000;
                     = "1 0 1 0 1 1 0 0 1 1 1 1 1 1 i i 1",
                       "x x x x x x x x x x x x x x x x";
     ;
# AT90s4414
part
                  = "4414";
   id
                  = "AT90S4414";
   desc
   stk500_devcode = 0x50;
   avr910 devcode = 0x28;
   signature = 0x1e 0x92 0x01;
   chip_erase_delay = 20000;
   pgm enable
                  = "1 0 1 0 1 1 0 0
                                       0 1 0 1 0 0 1 1",
                    "x x x x x x x x
                                      xxxx xxxx";
                  = "1 0 1 0 1 1 0 0
                                      1000 0000",
   chip erase
                    = 200;
   timeout
   stabdelay
                 = 100;
   cmdexedelay
                       = 25;
   synchloops
                       = 32;
   bytedelay
                 = 0;
   pollindex
                 = 3;
                 = 0x53;
   pollvalue
                 = 1;
   predelay
   postdelay
                 = 1;
   pollmethod
                       = 0:
   pp controlstack
       0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
       {\tt 0x4E,\ 0x5E,\ 0x4F,\ 0x5F,\ 0x6E,\ 0x7E,\ 0x6F,\ 0x7F,}
       0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
       0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x01;
   hventerstabdelay = 100;
   progmodedelay
                    = 0;
                   = 0;
   latchcycles
   togglevtg
                    = 0;
   poweroffdelay
                    = 0;
   resetdelayms
resetdelayus
                     = 0;
                     = 0;
                   = 15;
   hvleavestabdelay
   chiperasepulsewidth = 15;
```

```
chiperasepolltimeout = 0;
programfusepulsewidth = 2;
programfusepolltimeout = 0;
programlockpulsewidth = 0;
programlockpolltimeout = 1;
memory "eeprom"
   size
                = 256;
   min_write_delay = 9000;
   max_write_delay = 20000;
   readback_p1
               = 0x80;
                = 0x7f;
   readback_p2
                = " 1 0 1 0 0 0 0 x x x x x x x x 8",
   read
                  write
                = " 1 1 0 0 0 0 0 0 xxxx xxx a8",
                 "a7 a6 a5 a4 a3 a2 a1 a0 iiii iiii";
             = 0x04;
  mode
             = 12;
  delay
  blocksize
            = 64;
  readsize
            = 256;
memory "flash"
                = 4096;
   size
   min_write_delay = 9000;
   max write delay = 20000;
                = 0x7f;
   readback_p1
   readback_p2
                = 0x7f;
                        0 1
                                  0 0
                                            0",
   read lo
                = " 0
                              0
                                        0
                  " x x x x all al0 a9
                                           a8",
                  " a7 a6 a5 a4
                                 a3 a2 a1
                                           a0",
                  " 0
                       0
                          0
                             0
                                  0 0
                                         0
                                            o";
   read hi
                = " 0
                        0
                           1
                              0
                                  1 0
                                         0
                                            0",
                  " x
                          x
                                 all al0 a9 a8",
                       x
                             x
                  " a7 a6 a5 a4
                                 a3 a2 a1 a0",
                  " 0
                      0
                          0
                                  0 0
                = " 0
   write_lo
                       1
                           0
                              0
                                  0
                                     0
                                         0
                                            0",
                  " x
                       x
                          x
                             x
                                 all al0 a9
                                           a8",
                  " a7 a6 a5 a4
                                 a3 a2 a1 a0",
                                            i";
                = " 0
                           0
                                            0",
   write hi
                       1
                              0
                                 1 0
                                        0
                  " x
                       х
                          х
                                 a11 a10
                                        a9
                                           a8",
                             x
                  " a7 a6 a5 a4
                                 a3 a2 a1 a0",
                       i
                          i
                             i
                                  i i
                                        i
                                            i";
             = 0x04;
  mode
  delay
             = 12;
  blocksize
             = 64:
            = 256;
  readsize
memory "signature"
                = 3:
   size
                = "0 0 1 1 0 0 0 0 x x x x
   read
                                                   x x x x",
                 "хххх хха1 а0 оооо
                                                   0 0 0 0";
memory "fuse"
 size
             = 1;
memory "lock"
             = 1;
 size
             = "1 0 1 0 1 1 0 0 1 1 1 1 1 i i 1",
             "x x x x x x x x x x x x x x x x ;
  min write delay = 9000;
  max write delay = 9000;
```

```
# AT90s2313
part
    id
                    = "2313";
    desc
                    = "AT90S2313";
    stk500_devcode = 0x40;
    avr910_devcode = 0x20;
    signature
                  = 0x1e 0x91 0x01;
    chip_erase_delay = 20000;
                    = "1 0 1 0 1 1 0 0
                                         0 1 0 1 0 0 1 1",
    pgm_enable
                                         xxxx xxxx";
                      "x x x x x x x x
                    = "1 0 1 0 1 1 0 0 1 0 0 0 0 0 0 0",
    chip erase
                      = 200;
    timeout
    stabdelay
                   = 100;
    cmdexedelay
                         = 25;
    synchloops
                         = 32;
                   = 0;
   bytedelay
                   = 3;
    pollindex
                   = 0x53;
    pollvalue
                  = 1;
    predelay
   postdelay
                   = 1;
   pollmethod
                         = 0;
   pp controlstack
       0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
       0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
       0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
                    = 100;
= 0;
    hventerstabdelay
    progmodedelay
    latchcycles
                     = 0;
    togglevtg
                     = 0;
                     = 0;
    poweroffdelay
   resetdelayms
resetdelayus
                      = 0;
                      = 0;
                     = 15;
    hvleavestabdelay
    chiperasepulsewidth = 15;
    chiperasepolltimeout = 0;
    programfusepulsewidth = 2;
    programfusepolltimeout = 0;
    programlockpulsewidth = 0;
   programlockpolltimeout = 1;
   memory "eeprom"
       size
                      = 128;
       min_write_delay = 4000;
       max_write_delay = 9000;
                     = 0x80;
       readback p1
       readback_p2
                      = 0x7f;
                      = "1 0 1 0
                                     0 0 0 0
       read
                                                 x x x x x x x x x",
                         "x a6 a5 a4 a3 a2 a1 a0
                                                  0000 0000";
                       = "1 1 0 0
                                     0 0 0 0
       write
                                                 xxxx xxxx",
                        "x a6 a5 a4 a3 a2 a1 a0 iiii iiii";
                   = 0x04;
      mode
                  = 12;
      delay
      blocksize
                  = 64;
      readsize
                  = 256;
    memory "flash"
                      = 2048;
       size
       min_write_delay = 4000;
       max_write_delay = 9000;
```

```
= 0x7f:
      readback_p1
                    = 0x7f;
      readback_p2
                    = " 0
                           0 1
                                            0 0",
      read lo
                                 0
                                      0 0
                                      x x a9 a8",
                     " x x x x
                     " a7 a6 a5 a4
                                      a3 a2 a1 a0",
                      " 0 0
                                                o";
                               0
                                 0
                                      0 0
                                            0
      read hi
                    = " 0
                           0
                               1
                                  0
                                      1
                                          0
                                             0
                                                 0",
                      " x
                                         x a9 a8",
                              х
                           х
                                  х
                                      х
                      " a7 a6 a5 a4
                                      a3 a2 a1 a0",
                        0
                           0
                              0
                                      0 0
                                             0
                                                 0";
                    = " 0
                           1
                               0
                                  0
                                      0
                                         0
                                             0
                                                0",
      write lo
                      " x
                                         x a9 a8",
                           х
                              x
                                  x
                                      х
                      " a7 a6 a5 a4
                                      a3 a2 a1 a0",
                      " i
                          i
                              i
                                            i
      write hi
                    = " 0
                           1
                               0
                                  0
                                      1
                                          0
                                             0
                                                0",
                     " x
                                         ж а9 а8",
                           x
                              x
                                  x
                                      x
                      " a7 a6 a5 a4
                                      a3 a2 a1 a0",
                          i
                              i i
                                     i i i
                = 0x04;
     mode
                = 12;
     delay
                = 128;
     blocksize
               = 256;
     readsize
   memory "signature"
      size
                    = 3;
                    = "0 0 1 1 0 0 0 0
      read
                                            x x x x x x x x",
                     "x x x x x x a1 a0 0 0 0 0 0 0 0";
   memory "fuse"
                    = 1;
     size
   memory "lock"
     size
                   = 1;
                   = "1 0 1 0 1 1 0 0 1 1 1 x x i i x",
                     "x x x x x x x x x x x x x x x ;
      min write delay = 9000;
      max write delay = 9000;
# AT90s2333
#-----
  id
                = "2333";
##### WARNING: No XML file for device 'AT90S2333'! #####
   desc
                = "AT90S2333";
   stk500 devcode = 0x42;
   avr910_devcode = 0x34;
signature = 0x1e 0x91 0x05;
   chip erase delay = 20000;
                 = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
   pgm enable
                                   xxxx xxxx";
                   "x x x x x x x x
                 = "1 0 1 0 1 1 0 0 1 0 0 0 0 0 0 0",
   chip erase
                   "x x x x x x x x x x x x x x x x";
                = 200;
   timeout
   stabdelay
                = 100;
   cmdexedelay
                      = 25;
                      = 32;
   synchloops
   bytedelay
                = 0;
   pollindex
                = 3;
                = 0x53;
   pollvalue
   predelay
                = 1;
```

```
postdelay
pollmethod
pp_controlstack
    0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
    0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
   0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
                 = 100;
hventerstabdelay
progmodedelay
                  = 0;
latchcycles
                  = 0;
                   = 0;
togglevtg
poweroffdelay
                   = 0;
                   = 0;
resetdelayms
resetdelayus
                  = 0;
hvleavestabdelay
                 = 15;
chiperasepulsewidth = 15;
chiperasepolltimeout = 0;
programfusepulsewidth = 2;
programfusepolltimeout = 0;
programlockpulsewidth = 0;
programlockpolltimeout = 1;
memory "eeprom"
    size
                   = 128;
   min_write_delay = 9000;
   max write delay = 20000;
                   = 0x00;
   readback_p1
    readback_p2
                   = 0xff;
                                 0 0 0 0
                                               x x x x x x x x",
    read
                   = "1 0 1 0
                     "x a6 a5 a4 a3 a2 a1 a0
                                              0000 0000";
                   = "1 1 0 0
    write
                                 0 0 0 0
                                              xxxx xxxx",
                     "x a6 a5 a4 a3 a2 a1 a0 iiii iiii;
               = 0x04;
  mode
  delay
               = 12;
  blocksize
               = 128;
  readsize
               = 256;
memory "flash"
                   = 2048;
   size
   min write delay = 9000;
   max_write_delay = 20000;
    readback p1
                   = 0xff;
                   = 0xff;
    readback_p2
                   = " 0
                                    0
                                                    0",
    read lo
                            0
                              1
                                        0
                                           0
                                               0
                     " x
                           x
                              x
                                  x
                                        x x a9 a8",
                     " a7 a6
                               a5 a4
                                       a3 a2 a1
                                                   a0",
                        0
                            0
                               0
                                    0
                                        0
                                           0
                                                0
                                                    o";
                   = " 0
    read hi
                            0
                                    0
                                           0
                                                0
                                                    0",
                               1
                                        1
                     " x
                                        x x a9
                                                   a8",
                          х
                              х
                                   x
                     " a7 a6
                              a5
                                                   a0",
                                  a4
                                       a3 a2 a1
                                                    o";
                        0
                                                0
                            0
                               0
                                    0
                                        0
                                           0
                                                    0",
                   = " 0
    write_lo
                            1
                                0
                                    O
                                        0
                                           0
                                               0
                     " x
                                                   a8",
                          x
                                  х
                                        x
                                          x a9
                              х
                     " a7 a6
                               a5
                                       a3 a2
                                               a1
                                                   a0",
                                                i
                                                    i";
                       i
                            i
                                i
                                        i
                   = " 0
                                                    0",
                            1
                                0
                                    0
                                        1
                                            0
                                                0
    write_hi
                                                  a8",
                     " x
                                           ж а9
                           х
                                   х
                                        х
                               х
                     " a7 a6 a5 a4
                                       a3 a2 a1 a0",
                               i
                                  i
                                        i
                                           i
                                                i
                                                   i";
  mode
               = 0x04;
  delav
               = 12;
  blocksize
               = 128;
```

```
= 256;
      readsize
   memory "signature"
                     = 3;
      size
                     read
                       "x x x x x x a1 a0 o o o o o o o";
   memory "fuse"
                     = 1;
      size
      min write delay = 9000;
      max_write_delay = 20000;
       pwroff after write = yes;
                     = "0 1 0 1 0 0 0 0 xxxx xxxxx",
       read
                       "x x x x x x x x x x o o o o o o";
                     = "1 0 1 0 1 1 0 0 1 0 1 i i i i i",
       write
                       "x x x x x x x x x x x x x x x x";
   memory "lock"
                     = 1;
      size
      min_write_delay = 9000;
      max_write_delay = 20000;
       read
                    = "0 1 0 1 1 0 0 0 xxxx xxxx",
                       "x x x x x x x x x x x x x o o x";
       write
                     = "1 0 1 0 1 1 0 0 1 1 1 1 1 1 i i 1",
                       "x x x x x x x x x x x x x x x x ;
     ;
  ;
#-----
# AT90s2343 (also AT90s2323 and ATtiny22)
part
   id
                   = "2343";
   desc = "A13655

stk500_devcode = 0x43;

avr910_devcode = 0x4c;

= 0x1e_0x91_0x03;
   chip_erase_delay = 18000;
                 = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
   pgm_enable
                    "x x x x x x x x x x x x x x x x x ;
                   = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
   chip erase
                    "x x x x x x x x x x x x x x x x";
                  = 200;
   timeout
   stabdelay
                  = 100;
                        = 25;
   cmdexedelay
   synchloops
                        = 32;
                  = 0;
   bytedelay
   pollindex
                  = 3;
   pollvalue
                  = 0x53;
                  = 1;
   predelay
   postdelay
                  = 1;
                        = 0;
   pollmethod
   hvsp controlstack
       0x4C, 0x0C, 0x1C, 0x2C, 0x3C, 0x64, 0x74, 0x00, 0x68, 0x78, 0x68, 0x68, 0x00, 0x00, 0x68, 0x78,
       0x78, 0x00, 0x6D, 0x0C, 0x80, 0x40, 0x20, 0x10,
       0x11, 0x08, 0x04, 0x02, 0x03, 0x08, 0x04, 0x00;
                    = 100;
   hventerstabdelay
                    = 0;
   hvspcmdexedelay
   synchcycles
                     = 6;
                     = 1;
   latchcycles
   togglevtg
                    = 0;
```

```
= 25;
poweroffdelay
resetdelayms = 0;
resetdelayus = 50;
hvleavestabdelay
                = 100;
                 = 25;
resetdelay
chiperasepolltimeout = 40;
chiperasetime = 0;
programfusepolltimeout = 25;
programlockpolltimeout = 25;
memory "eeprom"
                 = 128;
   size
   min write delay = 9000;
   max_write_delay = 20000;
                = 0x00;
   readback p1
   readback p2
                 = 0xff;
                 = "1 0 1 0 0 0 0 0
                                          00000000",
   read
                   "x a6 a5 a4 a3 a2 a1 a0
                                          0000 0000";
                 = "1 1 0 0
                              0 0 0 0
                                          00000000",
   write
                  "x a6 a5 a4 a3 a2 a1 a0 iiii iiii;
              = 0x04;
  mode
              = 12;
  delay
             = 64;
  blocksize
  readsize
             = 256;
memory "flash"
                 = 2048;
   size
   min write delay = 9000;
   max write delay = 20000;
                = 0xff;
   readback p1
   readback_p2
                 = 0xff;
                 = " 0
   read lo
                         0
                            1
                                0
                                    0
                                       0
                                           0
                                               0",
                   " x x x x x " a7 a6 a5 a4
                                       x
                                           a9
                                              a8",
                                    x
                                    a3 a2
                                              a0",
                                           a1
                   " 0
                         0
                            0
                                0
                                    0
                                       0
                                           0
                                               o";
                 = " 0
                         0
                                0
                                           0
                                               0",
                             1
                                        0
   read hi
                                     1
                   " x
                         x
                            x
                                x
                                    x
                                        x
                                           a9
                                              a8",
                   " a7 a6
                            a5
                               a4
                                    a3 a2
                                           a1
                                               a0",
                                               0";
                     0
                         0
                            0
                                0
                                    0
                                       0
                                           0
                                               0",
                 = " 0
                                       0
                                           0
   write lo
                         1
                             0
                                0
                                     0
                                       x
                   " x x
                                           a9
                                              a8",
                                x
                                    х
                            х
                   " a7 a6
                            a5 a4
                                    a3 a2
                                           a1
                                              a0",
                   " i
                                               i";
                        i
                            i
                                i
                                    i
                                       i
                                           i
                                              0",
                 = " 0 1
                           0
                               0
                                       0
   write_hi
                                    1
                                           0
                   " x x x x
                                    x x a9 a8",
                                    a3 a2 a1
                   " a7 a6 a5 a4
                                              a0",
                   " i
                         i
                             i
                                i
                                    i
                                       i
                                            i
                                               i";
              = 0x04;
  delay
             = 12;
  blocksize
             = 128;
  readsize
             = 128;
memory "signature"
   size
                 = 3;
   read
                 = "0 0 1 1 0 0 0 0
                                          x x x x x x x x",
                   "x x x x
                              x x a1 a0
                                          0 0 0 0
memory "fuse"
                 = 1;
   min write delay = 9000;
   max_write_delay = 20000;
                 = "0 1 0 1 1 0 0 0 x x x x x x x x x",
                   "xxxx xxxx ooox xxxo";
```

```
= "1 0 1 0 1 1 0 0 1 1 1 1 1 1 i",
       write
                        "xxxx xxxx xxxx xxxx";
   memory "lock"
       size
       min_write_delay = 9000;
       max_write_delay = 20000;
                      = "0 1 0 1 1 0 0 0
                                          x x x x x x x x",
                        "x x x x x x x x
                                          0 0 0 x x x x 0";
       write
                      = "1 0 1 0 1 1 0 0 1 1 1 1 1 1 i i 1",
                       "x x x x x x x x x x x x x x x x";
     ;
              ______
# AT90s4433
#-----
part
   id
                  = "4433";
   desc
                   = "AT90S4433";
   stk500 devcode = 0x51;
   avr910_devcode = 0x30;
signature = 0x1e 0x92 0x03;
   chip erase delay = 20000;
                   = "1 0 1 0 1 1 0 0
                                        0101 0011",
   pgm_enable
                     "x x x x x x x x
                                       xxxx xxxx";
                   = "1 0 1 0 1 1 0 0
                                        10000000",
   chip_erase
                     "x x x x x x x x x x x x x x x x";
                  = 200;
   timeout
                  = 100;
   stabdelay
                        = 25;
   cmdexedelay
   synchloops
                        = 32;
   bytedelay
                  = 0;
   pollindex
                  = 3;
   pollvalue
                  = 0x53;
   predelay
                  = 1;
                  = 1;
   postdelay
                        = 0;
   pollmethod
   pp_controlstack
       0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F, 0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
       0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
       0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
   hventerstabdelay = 100;
   progmodedelay
                     = 0;
   latchcycles
                     = 0;
                     = 0;
   togglevtg
   poweroffdelay
                    = 0;
   resetdelayms
                     = 0;
   resetdelayus
                     = 0;
                    = 15;
   hvleavestabdelay
   chiperasepulsewidth = 15;
   chiperasepolltimeout = 0;
   programfusepulsewidth = 2;
   programfusepolltimeout = 0;
   programlockpulsewidth = 0;
   programlockpolltimeout = 1;
   memory "eeprom"
                     = 256;
       size
       min_write_delay = 9000;
       max write delay = 20000;
       readback_p1 = 0x00;
readback_p2 = 0xff;
```

```
= " 1 0 1 0
                              0 0 0 0
                                           x x x x x x x x",
   read
                   "a7 a6 a5 a4 a3 a2 a1 a0
                                           0000 0000";
                 = " 1 1 0 0 0 0 0 0 xxxx xxxxx",
   write
                  "a7 a6 a5 a4 a3 a2 a1 a0 iiii iiii";
             = 0x04;
  mode
  delay
             = 12;
  blocksize
             = 128;
  readsize
            = 256;
memory "flash"
                 = 4096;
   size
   min write delay = 9000;
   max_write_delay = 20000;
               = 0xff;
   readback p1
   readback_p2
                 = 0xff;
   read lo
                 = " 0
                        0
                           1
                               0
                                    0
                                      0
                                          0
                                              0",
                   " x
                        x
                            x
                               x
                                    x a10 a9 a8",
                   " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                  " 0
                        0
                            0
                                    0 0
                                           0
                                              o";
                               0
                 = " 0
   read hi
                         0
                                0
                                    1 0
                                          0
                                              0",
                            1
                   " x
                        х
                                   x a10
                                          a9
                                             a8",
                           x
                               x
                   " a7 a6
                                   a3 a2 a1
                           a5
                               a4
                                             a0",
                   " 0
                                              o";
                        0
                            0
                                    0
                                      0
                                          0
                               0
                 = " 0
                                              0",
                         1
                            O
                                O
                                    0
                                      0
                                          0
   write_lo
                   11
                     x
                        х
                               х
                                   x a10
                                          a9
                                             a8",
                            х
                   " a7 a6
                           a5 a4
                                   a3 a2
                                          a1
                                             a0",
                                      i
                   " i
                                          i
                                              i";
                        i
                            i
                               i
                                   i
                 = " 0
                                             0",
                              0
   write hi
                       1
                            0
                                    1 0
                                          0
                   " x x x x x " a7 a6 a5 a4
                                         a9 a8",
a1 a0",
                                   x a10
                                   a3 a2
                   " i
                        i i i
                                   i i
                                         i
                                             i";
  mode
             = 0x04;
             = 12;
  delav
  blocksize
             = 128;
             = 256;
  readsize
memory "signature"
  size
                = 3;
                 = "0 0 1 1 0 0 0 0
   read
                                         x x x x x x x x ",
                 "x x x x
                             x x a1 a0
                                                     0 0 0 0";
                                         0 0 0 0
memory "fuse"
   size
                 = 1;
   min_write_delay = 9000;
   max write delay = 20000;
   pwroff_after_write = yes;
                = "0 1 0 1 0 0 0 0 x x x x x x x x x",
   read
                  "x x x x x x x x x x o o o o o o";
                write
memory "lock"
   size
                 = 1;
   min write delay = 9000;
   max_write_delay = 20000;
                = "0 1 0 1 1 0 0 0
                                    x x x x x x x x",
   read
                  "x x x x x x x x x x x x 0 0 x";
                = "1 0 1 0 1 1 0 0 1 1 1 1 1 i i 1",
   write
                  "x x x x x x x x x x x x x x x x ;
 ;
```

```
#-----
# AT90s4434
#-----
               = "4434";
  id
##### WARNING: No XML file for device 'AT90S4434'! ####
  desc
               = "AT90S4434";
  stk500 devcode = 0x52;
  avr910_devcode = 0x6c;
signature = 0x1e 0x92 0x02;
   chip_erase_delay = 20000;
  pgm_enable = "1 0 1 0 1 1 0 0
                                0101 0011",
                 "xxxx xxxx xxxx xxxx";
              = "1 0 1 0 1 1 0 0 1 0 0 0 0 0 0 0",
   chip erase
                 memory "eeprom"
                  = 256;
     size
     min_write delay = 9000;
      max_write_delay = 20000;
     readback_p1 = 0x00;
     readback p2
                  = 0xff;
                  = " 1 0 1 0 0 0 0 0
      read
                                         x x x x x x x x",
                   "a7 a6 a5 a4 a3 a2 a1 a0 oooo ooo";
                 = " 1 1 0 0 0 0 0 0 xxxx xxxx",
"a7 a6 a5 a4 a3 a2 a1 a0 iiii iiii;
      write
                                         iiii iiii";
  memory "flash"
                  = 4096;
     size
      min write delay = 9000;
     max_write_delay = 20000;
                = 0xff;
= 0xff;
     readback p1
      readback_p2
                  = " 0 0 1 0 0 0 0 0",
      read lo
                   " x x x x
                                   x a10 a9 a8",
                    " a7 a6 a5 a4
                                 a3 a2 a1 a0",
                    " 0
                        0
                            0
                              0
                                   0 0
                                         0
      read hi
                  = " 0 0 1
                                        0 0",
                              0
                                  1 0
                    " x x x x
                                   x a10 a9 a8",
                    " a7 a6 a5 a4 a3 a2 a1 a0",
                    " 0 0 0 0
                                  0 0 0 0";
                                           0",
                  = " 0 1 0 0
      write lo
                                   0 0 0
                                  x a10 a9 a8",
                    " x x x x
                    " a7 a6 a5 a4
                                 a3 a2 a1 a0",
                    " i
                        i
                           i
                               i
                                   i i
                                        i
                                            i";
                  = " 0 1
                                   1 0
                                           0",
      write_hi
                           0 0
                                        0
                    " x x x x
                                   x a10 a9 a8",
                    " a7 a6 a5 a4 a3 a2 a1 a0",
                    " i
                        i
                           i i
                                  i i
                                        i i";
   memory "signature"
                  = 3;
     size
                  = "0 0 1 1 0 0 0 0 x x x x x x x x x x,
      read
                   "x x x x x x a1 a0 0 0 0 0 0 0 0";
  memory "fuse"
     size
                  = 1;
     min write delay = 9000;
     max write delay = 20000;
                  = "0 1 0 1 0 0 0 0 x x x x x x x x x",
     read
                    "x x x x x x x x x x o o o o o o";
                  = "1 0 1 0 1 1 0 0 1 0 1 i i i i i",
      write
                   "x x x x x x x x x x x x x x x x";
```

```
memory "lock"
       size
                     = 1;
       min_write_delay = 9000;
       max_write_delay = 20000;
                      = "0 1 0 1 1 0 0 0 xxxx xxxxx",
                        "x x x x x x x x x x x x x x o o x";
                      = "1 0 1 0 1 1 0 0 1 1 1 1 1 i i 1",
       write
                       "x x x x x x x x x x x x x x x x ;
     ;
# AT90s8515
 -----
part
   id
                   = "8515";
   desc
                   = "AT90S8515";
   stk500 devcode = 0x60;
   avr910\_devcode = 0x38;
   signature = 0x1e 0x93 0x01;
   chip_erase_delay = 20000;
                   = "1 0 1 0 1 1 0 0
                                        0 1 0 1 0 0 1 1",
   pgm_enable
                                      xxxx xxxx";
                     "x x x x x x x x
                   = "1 0 1 0 1 1 0 0
                                        100x xxxx",
   chip_erase
                     "x x x x x x x x
                                       xxxx xxxx";
                  = 200:
   timeout
   stabdelay
                  = 100;
   cmdexedelay
                        = 25;
   synchloops
                         = 32;
                  = 0;
   bytedelay
                  = 3;
   pollindex
   pollvalue
                  = 0x53;
   predelay
                  = 1;
   postdelay
                  = 1;
   pollmethod
                         = 0;
   pp_controlstack
      0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
      0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
      0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
   hventerstabdelay = 100;
   progmodedelay
                     = 0;
   latchcycles
                     = 0;
                     = 0;
   togglevtg
   poweroffdelay
                     = 0;
   resetdelayms
resetdelayus
                     = 0;
                     = 0;
   hvleavestabdelay = 15;
   resetdelay
                     = 15;
   chiperasepulsewidth = 15;
   chiperasepolltimeout = 0;
   programfusepulsewidth = 2;
   programfusepolltimeout = 0;
   programlockpulsewidth = 0;
   programlockpolltimeout = 1;
   memory "eeprom"
                      = 512;
       size
       min write delay = 4000;
       max_write_delay = 9000;
       readback_p1 = 0x80;
       readback_p2
                      = 0x7f;
                      = " 1 0 1 0 0 0 0 0 xxxx xxx xxx a8",
       read
                        "a7 a6 a5 a4 a3 a2 a1 a0  oooo ooo";
```

```
= " 1 1 0 0 0 0 0 0 0 x x x x x x x x a8",
"a7 a6 a5 a4 a3 a2 a1 a0 iiii iii;
      write
                = 0x04;
     delay = 12;
blocksize = 128;
readsize = 256;
   memory "flash"
      size
                  = 8192;
      min_write_delay = 4000;
      max write delay = 9000;
                  = 0x7f;
      readback p1
      readback_p2
                   = 0x7f;
      read lo
                   = " 0 0 1 0 0 0 0 0",
                     " x x x x all alo a9 a8",
" a7 a6 a5 a4 a3 a2 al a0",
                     " 0
                          0
                              0
                                 0
                                     0
                                            0
                                                o";
                                              0",
      read hi
                   = " 0 0
                             1
                                0
                                     1 0
                     " x x x x
                                    all al0 a9 a8",
                     " a7 a6 a5 a4
                                    a3 a2 a1 a0",
                       0
                           0
                              0
                                 0
                                      0
                                              0",
                   = " 0 1
      write_lo
                              0
                                0
                                    0 0
                                           0
                     " x x x all alo a9 a8",
                     " a7 a6 a5 a4
                                    a3 a2 a1 a0",
                          i
                              i
                                 i
                                     i
                   = " 0 1 0 0
                                           0 0",
      write_hi
                                    1 0
                     " x x x x all al0 a9 a8",
                     " a7 a6 a5 a4 a3 a2 a1 a0",
                     " i i i i i i";
                = 0x04;
     mode
     delav
               = 12;
     blocksize
               = 128;
               = 256;
     readsize
   memory "signature"
     size
                   = 3:
                   = "0 0 1 1 0 0 0 0 x x x x x x x x x,",
      read
                    "x x x x x x a1 a0 0 0 0 0 0 0 0";
   memory "fuse"
                = 1;
     size
   memory "lock"
    size
                = 1;
                = "1 0 1 0
"x x x x
                            1 1 0 0
x x x x
                                       1 1 1 1 1 i i 1",
                                                  x x x x";
                                        x x x x
     min write delay = 9000;
      max write delay = 9000;
 ;
#-----
#-----
part
  id = "8535";
desc = "AT90S8535";
   stk500_devcode = 0x61;
   avr910_devcode = 0x68;
   signature = 0x1e 0x93 0x03;
   chip erase delay = 20000;
   pgm_enable = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
                  "x x x x x x x x x x x x x x x x x x ";
```

```
chip erase
               = 200;
timeout
               = 100;
stabdelay
cmdexedelay
                     = 25;
synchloops
                     = 32;
               = 0;
bytedelay
pollindex
               = 3;
pollvalue
              = 0x53;
predelay
               = 1;
postdelay
               = 1;
                     = 0;
pollmethod
pp_controlstack
   0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
   0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
hventerstabdelay = 100;
progmodedelay
                 = 0;
                  = 0;
latchcycles
                  = 0;
togglevtg
                  = 0;
poweroffdelay
resetdelayms
                  = 0;
resetdelayus
                 = 0;
                 = 15;
hvleavestabdelay
chiperasepulsewidth = 15;
chiperasepolltimeout = 0;
programfusepulsewidth = 2;
programfusepolltimeout = 0;
programlockpulsewidth = 0;
programlockpolltimeout = 1;
memory "eeprom"
   size
                  = 512;
   min write delay = 9000;
   max_write_delay = 20000;
   readback_p1
                  = 0x00;
   readback_p2
                  = 0xff;
                   = " 1 0 1 0
                                 0 0 0 0
                                               xxxx xxx a8",
   read
                    "a7 a6 a5 a4 a3 a2 a1 a0
                                               0000 0000";
                   = " 1 1 0 0
   write
                                  0 0 0 0
                                               x x x x x x x a8",
                    "a7 a6 a5 a4 a3 a2 a1 a0
                                               1111 1111";
              = 0x04;
  mode
  delay
              = 12;
  blocksize
               = 128;
  readsize
               = 256;
memory "flash"
                  = 8192;
   size
   min write delay = 9000;
   max_write_delay = 20000;
   readback p1
                  = 0xff;
                  = 0xff;
   readback_p2
                                                   0",
                   = " 0 0 1
                                 0
                                     0 0
                                              0
   read lo
                    " x x x x all al0 a9 a8",
                     " a7 a6 a5 a4
                                       a3 a2 a1
                                                  a0",
                     "
                       0
                           0
                               0
                                  0
                                       0
                                               0
   read hi
                   = " 0
                           0
                              1
                                  0
                                       1 0
                                              0
                                                   0",
                     " x x
                                                 a8",
                              x
                                 x all al0 a9
                     " a7 a6 a5 a4
                                      a3 a2 a1
                                                  a0",
                     " 0
                                                   0";
                          0
                              0
                                  0
                                       0 0
                                               0
                                                   0",
                   = " 0 1
   write_lo
                               0
                                   0
                                       0 0
                                              0
                    " x
                                  x all al0 a9 a8",
                           х
                               х
```

```
a0",
                     " a7
                         a6
                            a5
                                a4
                                    a3
                                       a2
                                          a1
                     " i
                          i
                             i
                                i
                                    i
                                       i
                                           i
                                              i";
                   = " 0
      write_hi
                         1
                             0
                                0
                                   1 0
                                          0
                                              0",
                    " x x
                               x all al0 a9 a8",
                            x
                    " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                         i
                            i
                                i
                                    i
                                              i";
               = 0x04;
     mode
     delay
               = 12;
     blocksize
               = 128;
              = 256;
     readsize
   memory "signature"
     size
                  = 3;
                   = "0 0 1 1 0 0 0 0
      read
                                         x x x x",
                    "x x x x x x a1 a0 0 0 0 0 0 0 0 ";
   memory "fuse"
                = 1;
    size
                = "0 1 0 1
     read
                            1 0 0 0
                                       x x x x
                                                 x x x x",
                 "x x x x
                            \mathbf{x} \mathbf{x} \mathbf{x}
                                     x x x x
                                                 x x x o";
                = "1 0 1 0
"x x x x
                            1 1 0 0
                                       1 0 1 1
                                                 1 1 1 i",
     write
                               x
                                 х х
                            x
                                       x x x x
      min write delay = 9000;
     max_write_delay = 9000;
   memory "lock"
     size
                = 1;
                = "0 1 0 1
     read
                            1 0 0 0
                                       x \quad x \quad x \quad x
                                                 х х х
                 "x x x x
                                       0 0 X X
                                                 x x x x";
                            x x x
                = "1 0 1 0 1 1 0 0 1 1 1 1
                                                 1 i i 1",
                "x x x x
                            x \quad x \quad x
                                      x x x x
                                                 x x x x";
      min_write_delay = 9000;
     max write delay = 9000;
 ;
# ATmega103
#-----
part
   id
                = "m103";
   desc
                = "ATmega103";
   stk500 devcode = 0xB1;
   avr910_devcode = 0x41;
   signature = 0x1e 0x97 0x01;
   chip_erase_delay = 112000;
   pgm_enable
                = "1 0 1 0 1 1 0 0
                                  0101 0011",
                  "x x x x x x x x
                                  xxxx xxxx";
                = "1 0 1 0 1 1 0 0
                                  1000 0000",
   chip_erase
                  = 200;
   timeout
   stabdelay
                = 100;
                     = 25;
   cmdexedelay
                     = 32;
   synchloops
   bytedelay
                = 0;
   pollindex
               = 3;
               = 0x53;
   pollvalue
   predelay
               = 1;
               = 1;
   postdelay
   pollmethod
                    = 0;
   pp_controlstack
      0x66, 0x76, 0xE6, 0xF6, 0x6A, 0x7A, 0xEA, 0x7A,
```

```
0x7F, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
hventerstabdelay = 100;
progmodedelay = 0;
latchcycles
                = 0;
togglevtg
                = 0;
poweroffdelay
                = 0;
resetdelayms
                 = 0;
resetdelayus
                 = 0;
               = 15;
hvleavestabdelay
chiperasepulsewidth = 15;
chiperasepolltimeout = 0;
programfusepulsewidth = 2;
programfusepolltimeout = 0;
programlockpulsewidth = 0;
programlockpolltimeout = 10;
memory "eeprom"
                 = 4096;
   size
   min_write_delay = 4000;
   max_write_delay = 9000;
               = 0x80;
   readback_p1
   readback_p2
                = 0x7f;
                                                0",
  read
                = " 1 0
                           1
                               0
                                     0 0
                                            0
                   " x x x
                               x
                                    all al0 a9 a8",
                   " a7 a6 a5 a4
                                    a3 a2 a1 a0",
                   " 0
                                                o";
                        0
                            0
                                     0
                               0
                                         0
                                            0
                = " 1
                                     0
                                       0
                                                0",
                        1
                           0
                               0
                                            0
  write
                     х
                                    all al0 a9
                                               a8",
                        х
                            х
                               х
                   " a7 a6 a5 a4
                                     a3 a2 a1
                                                a0",
                   " i
                                                i";
                            i
                                        i
                                            i
                        i
                               i
                                     i
  mode
             = 0x04;
             = 12;
  delay
           = 6-1,
= 256;
  blocksize
  readsize
memory "flash"
   paged
                 = yes;
   size
                 = 131072;
   page_size
                = 256;
                = 512;
   num pages
   min_write_delay = 22000;
   max_write_delay = 56000;
               = 0xff;
   readback p1
                 = 0xff;
   readback_p2
                                                 0",
                 = " 0 0 1 0
                                     0 0 0
   read_lo
                   "a15 a14 a13 a12
                                    a11 a10 a9
                                                a8",
                   " a7 a6 a5 a4
                                    a3 a2 a1
                                                a0",
                   " 0
                        0
                            0
                               0
                                      0 0
                                                0";
                 = " 0 0 1 0
   read hi
                                     1 0
                                            0
                                               0",
                   "a15 a14 a13 a12
                                    all al0 a9 a8",
                   " a7 a6 a5 a4
                                               a0",
                                    a3 a2 a1
                   " 0 0
                                     0 0
                           0
                                                0";
                               0
                                                0",
                 = " 0
   loadpage_lo
                        1
                            0
                               0
                                     0 0 0
                   " x x
                                                x",
                           х х
                                      х х х
                   " x a6 a5 a4
                                     a3 a2 a1
                                                a0",
                   " i
                                                i";
                        i
                            i
                               i
                                      i
                                        i
                 = " 0
                                                 0",
                         1
                             0
                                0
                                      1
                                          0
                                            0
   loadpage_hi
                   " x
                                                x",
                                      x x x
                        x
                           х
                               x
                   11
                     ж а6
                           a5 a4
                                     a3 a2 a1
                                                a0",
                                                i";
                        i
                            i
                                i
                                     i
                                        i
                                            i
                     i
   writepage
                 = " 0 1 0 0
                                      1
                                          1
                                            0
                                                 0",
                                    all al0 a9 a8",
                   "a15 a14 a13 a12
                   " a7 x x x
                                      х х
                                           х
                                                 x",
```

```
x":
                        х
                            х х х
                                         x x x
                 = 0x11;
     mode
     delay
                = 70;
              = 256;
     blocksize
     readsize
                = 256;
   memory "fuse"
      size
                    = 1;
                    = "0 1 0 1 0 0 0 0 x x x x x x x x x",
      read
                      "x x x x x x x x x x o x o 1 o o";
                    = "1 0 1 0 1 1 0 0 1 0 1 1 i 1 i i",
      write
                     "x x x x x x x x x x x x x x x x";
      min write delay = 9000;
      max write delay = 9000;
   memory "lock"
      size
                    = 1;
      read
                    = "0 1 0 1 1 0 0 0 x x x x x x x x x",
                      "x x x x x x x x x x x x x x o o x";
                    = "1 0 1 0 1 1 0 0 1 1 1 1 1 i i 1",
      write
                     "x x x x x x x x x x x x x x x x";
      min write delay = 9000;
      max write delay = 9000;
   memory "signature"
      size
                    = 3;
                    = "0 0 1 1 0 0 0 0 x x x x x x x x x,
      read
                     "x x x x x x a1 a0 0 0 0 0 0 0 0";
     ;
# ATmega64
#-----
part
                 = "m64";
  id
                 = "ATmega64";
   desc
                = yes;
   has jtag
   stk500_devcode = 0xA0;
   avr910 devcode = 0x45;
   signature = 0x1e 0x96 0x02;
   chip_erase_delay = 9000;
   pagel
                 = 0 \times D7;
   bs2
                 = 0xA0;
                 = dedicated;
   reset
   pgm enable
                = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
                   "x x x x x x x x x x x x x x x x x ;
                 = "1 0 1 0 1 1 0 0 1 0 0 0 0 0 0 0",
   chip erase
                   "xxxx xxxx xxxx xxxx";
   timeout
                 = 200;
   stabdelay
                = 100;
                      = 25;
   cmdexedelay
                      = 32;
   synchloops
   bytedelay
                = 0;
   pollindex
                = 3;
   pollvalue
                = 0x53;
   predelay
                 = 1;
   postdelay
                 = 1;
                      = 0;
   pollmethod
```

```
pp_controlstack
   0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F, 0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
    0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
    0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
hventerstabdelay = 100;
progmodedelay
                   = 0;
latchcycles
                   = 6;
                   = 0;
togglevtg
poweroffdelay
                  = 0;
resetdelayms
                   = 0;
                 = 0;
= 15;
resetdelayus
hvleavestabdelay
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
                   = 0x22;
spmcr
                   = 0x68;
allowfullpagebitstream = yes;
ocdrev
                   = 2;
memory "eeprom"
                   = no; /* leave this "no" */
   paged = no; /* leave this ...

page_size = 8; /* for parallel programming */
- 2048:
   paged
   min_write_delay = 9000;
   max_write_delay = 9000;
                 = 0xff;
   readback_p1
   readback_p2
                   = 0xff;
    read
                   = " 1
                            0
                                1
                                   0
                                          0 0
                                                  0
                                                       0",
                     " x
                               х х
                                         a11 a10 a9
                                                      a8",
                           x
                     " a7 a6 a5 a4
                                         a3 a2 a1
                                                      a0",
                     " 0 0 0
                                          0 0 0
                   = " 1
    write
                            1
                                0
                                   0
                                          0 0
                                                  0
                                                      0",
                     " x
                                         all al0 a9 a8",
                           x
                               x
                                   x
                     " a7 a6 a5 a4
                                         a3 a2 a1 a0",
                           i
               = 0x04;
  mode
               = 20;
  delay
               = 64;
  blocksize
  readsize
              = 256;
memory "flash"
   paged
                   = yes;
                   = 65536;
   size
   page size
                 = 256;
                  = 256;
   num_pages
   min_write_delay = 4500;
   max write delay = 4500;
   readback_p1
                   = 0xff;
                   = 0xff;
   readback_p2
    read lo
                   = " 0 0 1 0
                                          0 0 0 0",
                     " x a14 a13 a12
                                         all al0 a9
                                                      a8",
                     " a7 a6 a5 a4
                                                      a0",
                                         a3 a2
                                                  a1
                     " 0
                           0
                                0
                                    0
                                           0
                                              0
                                                      o";
    read hi
                   = " 0 0 1 0
                                          1 0
                                                 0
                                                      0",
                     " x a14 a13 a12
                                         all al0 a9 a8",
                     " a7 a6 a5 a4
                                         a3 a2 a1
                                                      a0",
                     " 0
                            0
                               0
                                          0
                                              0
```

```
= "
                                                   0",
                      0
                          1
                              0
                                 0
                                        0
                                           0
   loadpage_lo
                                               0
                   " x x x x x " x a6 a5 a4
                                       х х
a3 a2
                                                  х",
                                              x
                                                  a0",
                                              a1
                   " i
                         i
                            i
                                i
                                       i
                                          i
                                              i
                                                  i";
                  = " 0
                                                  0",
                         1
                             0
                                 0
                                           0
                                              0
   loadpage_hi
                                       1
                   " x x
" x a6
                                       х х
a3 a2
                                                  x",
                             х
                                 х
                                              х
                             a5 a4
                                              a1
                                                  a0",
                   " i
                                                  i";
                         i
                             i
                                 i
                                       i
                                          i
                                              i
                  = " 0 1 0 0
                                                 0",
   writepage
                                       1 1 0
                   " x a14 a13 a12
                                      all al0 a9 a8",
                   mode = 6;
blocksize = 128;
deize = 256;
             = 0x21;
memory "lfuse"
                 = 1;
  size
                  = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
   write
                   "xxxx xxxx iiii iiiii";
                  = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
                   "x x x x x x x x o o o o o o o o";
  min write delay = 9000;
   max write delay = 9000;
memory "hfuse"
                 = 1;
   size
                  = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
   write
                   "xxxx xxxx iiii iiiii";
                  = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
                   "x x x x x x x x o o o o o o o o";
  min write delay = 9000;
   max write delay = 9000;
memory "efuse"
   size
                 = 1;
                  = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
   write
                   "x x x x x x x x x x x x x i i";
                  = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
                   "x x x x x x x x 0 0 0 0 0 0 0 0";
   min_write_delay = 9000;
   max_write_delay = 9000;
memory "lock"
                 = 1;
   size
                  = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0",
   read
                   "x x x x x x x x x x o o o o o o";
                  = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
                  "x x x x x x x x x 1 1 i i i i i i i;
   min write delay = 9000;
   max write delay = 9000;
memory "calibration"
  size
                 = 4;
                  = "0 0 1 1 1 0 0 0 x x x x x x x x x",
   read
                   "0 0 0 0 0 0 al a0 0 0 0 0 0 0 0";
```

```
memory "signature"
                       = 3;
       size
                       = "0 0 1 1 0 0 0 0 x x x x x x x x x,",
        read
                         "x x x x x x a1 a0 0 0 0 0 0 0 0";
  ;
# ATmega128
part
    id
                    = "m128";
   desc = "ATmega128";
has_jtag = yes;
    stk500_devcode = 0xB2;
    avr910_devcode = 0x43;
signature = 0x1e 0x97 0x02;
    chip_erase_delay = 9000;
                    = 0xD7;
    pagel
                    = 0xA0;
    bs2
    reset
                    = dedicated;
    pgm enable
                   = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
                      "x x x x x x x x x x x x x x x x ;
                    = "1 0 1 0 1 1 0 0
                                           1000 0000",
    chip erase
                      timeout
                   = 200;
    stabdelay
                    = 100;
    cmdexedelay
                          = 25;
                          = 32;
    synchloops
    bytedelay
                   = 0;
    pollindex
                   = 3;
    pollvalue
                   = 0x53;
    predelay
                    = 1;
    postdelay
                   = 1;
                          = 0:
    pollmethod
   pp_controlstack
       0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F, 0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
        0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
    hventerstabdelay = 100;
   progmodedelay
                       = 0;
    latchcycles
                       = 6;
                       = 0;
    togglevtg
                      = 0;
    poweroffdelay
   resetdelayms
                       = 0;
                      = 0;
= 15;
    resetdelayus
    hvleavestabdelay
    chiperasepulsewidth = 0;
    chiperasepolltimeout = 10;
    programfusepulsewidth = 0;
    programfusepolltimeout = 5;
    programlockpulsewidth = 0;
    programlockpolltimeout = 5;
    idr
                       = 0x22;
                       = 0x68;
                       = 0x3b;
    rampz
    allowfullpagebitstream = yes;
    ocdrev
                        = 1;
```

```
memory "eeprom"
                = no; /* leave this "no" */
  paged
               = 8; /* for parallel programming */
   page size
               = 4096;
   size
   min write delay = 9000;
   max_write_delay = 9000;
             = 0xff;
   readback_p1
   readback_p2
                = 0xff;
                                   0 0 0 0",
   read
                = " 1
                        0 1 0
                  " x x x x
                                  all al0 a9 a8",
                  " a7 a6 a5 a4
                                  a3 a2 a1 a0",
                  " 0 0 0 0
                                   0 0 0 0";
                = " 1 1 0 0
                                   0 0 0 0",
   write
                  " x x x x
                                  all al0 a9 a8",
                  " a7 a6 a5 a4
                                  a3 a2 a1 a0",
                  " i i
                          i i
                                   i i i
             = 0x04;
  mode
            = 12;
  delay
 blocksize
            = 64;
 readsize
            = 256;
memory "flash"
  paged
               = yes;
   size
               = 131072;
             = 256;
  page_size
   num_pages
                = 512;
   min write delay = 4500;
   max write delay = 4500;
   readback_p1
              = 0xff;
   readback_p2
                = 0xff;
   read lo
                = " 0 0 1 0
                                 0 0 0
                                              0",
                  "a15 a14 a13 a12
                                   a11 a10 a9
                                              a8",
                  " a7 a6 a5 a4
                                  a3 a2 a1
                                              a0",
                  " 0
                       0
                          0
                             0
                                    0 0
                                          0
                                              0";
                = " 0 0 1
                               0
                                   1 0
                                              0",
                                          0
   read hi
                  "a15 a14 a13 a12
                                   a11 a10
                                          a9
                                              a8",
                  " a7 a6 a5 a4
                                    a3 a2
                                          a1
                                              a0",
                  " 0
                                              0";
                          0
                                    0 0
                       0
                              0
                                          0
                                              0",
                = " 0 1
                                   0 0 0
   loadpage lo
                           0
                             0
                  11
                          x
                             х
                                   x x x
a3 a2 a1
                                             x",
                    х х
                  " x a6 a5 a4
                                              a0",
                  " i
                                              i";
                       i
                          i
                              i
                                    i
                                       i
                                          i
                                              0",
                = " 0 1 0
                             0
   loadpage_hi
                                   1 0 0
                  " x x x x x " x a6 a5 a4
                                   x x x
a3 a2 a1
                                             x",
                                              a0",
                        i
                           i
                               i
                                    i
                                       i
                                              i";
                = " 0 1 0 0
                                    1 1 0
                                             0",
   writepage
                  "a15 a14 a13 a12
                                   all al0 a9 a8",
                  x x x x x x
                                              x",
                                               x";
            = 0x21;
  mode
            = 6;
 blocksize
            = 128;
  readsize
             = 256;
memory "lfuse"
  size
                = 1;
                = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
   write
                  "xxxx xxxx iiii iiii";
               = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
   read
```

```
"x x x x x x x x o o o o o o o o";
      min write delay = 9000;
      max_write_delay = 9000;
   memory "hfuse"
      size
                    = 1;
                    = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
       write
                      "xxxx xxxx iiii iiii";
                     = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
                     "x x x x x x x x o o o o o o o o";
      min write delay = 9000;
      max write delay = 9000;
   memory "efuse"
                    = 1;
      size
                    = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
       write
                      "x x x x x x x x x x x x x i i";
                     = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
                     "x x x x x x x x o o o o o o o o";
      min write delay = 9000;
      max_write_delay = 9000;
   memory "lock"
                    = 1;
      size
                    = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
       read
                      "x x x x x x x x x x o o o o o o";
       write
                    = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
                     "x x x x x x x x 1 1 i i i i i i ";
      min write delay = 9000;
      max write delay = 9000;
   memory "calibration"
      size
                    = 4;
                     = "0 0 1 1 1 0 0 0 x x x x x x x x",
       read
                      "0 0 0 0 0 0 al a0 0000 0000";
   memory "signature"
                    = 3;
      size
                     = "0 0 1 1 0 0 0 0 x x x x x x x x x x ,
      read
                      "x x x x x x a1 a0 o o o o o o o";
# AT90CAN128
part
   id
                 = "c128";
                 = "AT90CAN128";
   desc
                = yes;
   has jtag
   stk500 devcode = 0xB3;
  avr910_devcode = 0x43;
signature = 0x1e 0x97 0x81;
#
   chip erase delay = 9000;
   page1 = 0xD7;
   bs2
                 = 0xA0;
   reset
                 = dedicated;
                 pgm_enable
              = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
   chip_erase
```

```
"x x x x x x x x
                                       x x x x x x x x";
timeout
               = 200;
stabdelay
               = 100;
                      = 25;
cmdexedelay
                      = 32;
synchloops
bytedelay
               = 0;
pollindex
               = 3;
               = 0x53;
pollvalue
predelay
               = 1;
postdelay
               = 1;
pollmethod
                     = 1;
pp_controlstack
    0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
    {\tt 0x4E,\ 0x5E,\ 0x4F,\ 0x5F,\ 0x6E,\ 0x7E,\ 0x6F,\ 0x7F,}
   0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x01;
hventerstabdelay = 100;
                   = 0;
progmodedelay
latchcycles
                  = 6;
togglevtg
                  = 0;
poweroffdelay
                   = 0;
                   = 0;
resetdelayms
resetdelayus
                   = 0;
hvleavestabdelay = 15;
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
                   = 0x31;
idr
                   = 0x57;
spmcr
rampz
                   = 0x3b;
eecr
                   = 0x3f;
allowfullpagebitstream = no;
ocdrev
                   = 3;
memory "eeprom"
                   = no; /* leave this "no" */
   paged
                 = 8; /* for parallel programming */
   page size
                   = 4096;
   size
   min write delay = 9000;
   max_write_delay = 9000;
   readback_p1 = 0xff;
   readback_p2
                   = 0xff;
                  = " 1 0
                               1
                                   0
                                         0
                                            0
                                                 0
                                                     0",
  read
                     " 0
                           0
                               0
                                   х
                                         a11 a10
                                                 a9
                                                     a8",
                     " a7 a6 a5 a4
                                                      a0",
                                          a3 a2 a1
                                                      0";
                       0
                            0
                                0
                                   0
                                           0
                                              0
                                                  0
                                                     0",
                  = " 1
                               0
                                   0
                                         0 0
  write
                           1
                                                 0
                     " 0
                           0
                               0
                                         all al0 a9 a8",
                                   x
                     " a7
                           a6
                               a5
                                   a4
                                          a3 a2
                                                  a1
                                                      a0",
                                              i
                                                      i";
                       i
                           i
                                i
                                   i
                                          i
                                                  i
                                             0
  loadpage lo
               = " 1
                       1
                            0
                                0
                                       0
                                          0
                                                 1",
                    0
                       0
                            0
                                0
                                       0
                                          0 0
                                                 0",
                 **
                    0
                        0
                            0
                                0
                                       0
                                          a2
                                             a1
                                                  a0",
                    i
                        i
                            i
                                i
                                       i
                                           i
                                               i
                                                  i";
  writepage
               = " 1
                        1
                            0
                                0
                                      0
                                          0
                                             1
                                                   0",
                 " 0
                       0 x
                                     a11 a10 a9
                                                  a8",
                              х
                 " a7
                       a6 a5
                               a4
                                     a3
                                          0
                                              0
                                                   0",
                        х
                                           x
                                              x
                                                   x";
                                x
                                      x
```

```
= 0x41:
  mode
             = 20;
  delay
            = 8;
  blocksize
            = 256;
 readsize
memory "flash"
  paged
                = yes;
               = 131072;
   size
             = 256;
  page size
  num pages
                = 512;
   min_write_delay = 4500;
   max_write_delay = 4500;
                = 0xff;
   readback p1
   readback_p2
                = 0xff;
   read lo
                = " 0 0 1 0
                                   0 0 0 0",
                  "a15 a14 a13 a12 a11 a10 a9 a8",
                                  a3 a2 a1
                  " a7 a6 a5 a4
                                              a0",
                  " 0
                       0
                           0
                                    0
                                              o";
                                    1 0 0
                                             0",
   read hi
                = " 0 0 1 0
                  "a15 a14 a13 a12
                                   all al0 a9 a8",
                  " a7 a6 a5 a4
                                  a3 a2 a1 a0",
                       0
                          0
                              0
                                    0
                                       0
                = " 0 1 0
   loadpage_lo
                             0
                                   0 0 0
                  " 0 0 0 x
                                             x",
                                    х х х
                  " x a6 a5 a4
                                             a0",
                                    a3 a2 a1
                       i
                           i
                              i
                                    i
                                       i i
                                              i";
                = " 0 1
                                    1 0 0
                                              0",
                           0 0
   loadpage_hi
                  " 0 0 0 x
                                    x x x x",
                  " x a6 a5 a4
                                    a3 a2 a1 a0",
                  11
                    i i
                          i
                              i
                                    i i i
                                              i";
                = " 0 1 0 0
                                    1 1 0 0",
   writepage
                                   all al0 a9 a8",
                  "a15 a14 a13 a12
                  " а7 х х х
                                   x x x x",
                  " x x x x
                                   x x x x";
  mode
             = 0x41;
  delay
             = 6;
  blocksize
            = 256;
  readsize
            = 256;
memory "lfuse"
  size
                = 1;
                = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
   write
                  "x x x x x x x x i i i i i i i i i;
                = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0",
   read
                  "x x x x x x x x 0 0 0 0 0 0 0 0";
  min write delay = 9000;
  max write delay = 9000;
memory "hfuse"
  size
                = 1;
                = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
   write
                  "x x x x x x x x i i i i i i i i ;
                = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
   read
                  "x x x x x x x x 0 0 0 0 0 0 0 0";
  min write delay = 9000;
  max_write_delay = 9000;
memory "efuse"
   size
                = 1;
```

```
= "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
       write
                        "xxxx xxxx xxxx iiii";
                      = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
       read
                       "x x x x x x x x 0 0 0 0 0 0 0 0";
      min write delay = 9000;
      max_write_delay = 9000;
   memory "lock"
      size
                     = 1;
                     = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
       read
                       "x x x x x x x x x x o o o o o o";
                     = "1 0 1 0 1 1 0 0 1 1 1 x x x x x x",
       write
                       "xxxx xxxx 11ii iiii";
      min write delay = 9000;
      max write delay = 9000;
   memory "calibration"
     size
                     = 1;
                     = "0 0 1 1 1 0 0 0 0 0 0 x x x x x",
"0 0 0 0 0 0 0 0 0 0 0 0 0 0 0;
       read
   memory "signature"
     size
                     = 3:
                     = "0 0 1 1 0 0 0 0
       read
                                                x x x x x x x x",
                       "x x x x
                                   x x a1 a0
                                                0 0 0 0
                                                            0 0 0 0";
# AT90CAN64
#-----
                 = "c64";
   id
             = "ATS;
= yes;
   desc
                  = "AT90CAN64";
   has_jtag
   stk500 devcode = 0xB3;
   avr910_devcode = 0x43;
signature = 0x1e 0x96 0x81;
   chip erase delay = 9000;
   pagel
                   = 0xD7;
                  = 0xA0;
   bs2
   reset
                  = dedicated;
                 = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
   pgm_enable
                    "x x x x x x x x x x x x x x x x ;
                  = "1 0 1 0 1 1 0 0
   chip_erase
                                        100x xxxx",
                     = 200;
   timeout
   stabdelay
                  = 100;
                        = 25;
   cmdexedelay
                        = 32;
   synchloops
                 = 0;
   bytedelay
   pollindex
                  = 3;
                  = 0x53;
   pollvalue
   predelay
                  = 1;
   postdelay
                  = 1;
   pollmethod
                        = 1;
   pp_controlstack
       0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F, 0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
       0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x01;
```

```
hventerstabdelay
                 = 100;
progmodedelay
                 = 0;
                 = 6;
latchcycles
togglevtg
                = 0;
                = 0;
poweroffdelay
                 = 0;
resetdelayms
resetdelayus
                 = 0;
                = 15;
hvleavestabdelay
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
idr
                 = 0x31;
                 = 0x57;
spmcr
rampz
                 = 0x3b;
eecr
                 = 0x3f;
allowfullpagebitstream = no;
ocdrev
                 = 3;
memory "eeprom"
                 = no; /* leave this "no" */
   paged
               = 8; /* for parallel programming */
   page_size
                = 2048;
   min_write_delay = 9000;
   max_write_delay = 9000;
   readback p1
                 = 0xff;
                 = 0xff;
   readback_p2
                = " 1 0
                               0
                                      0 0
                                             0
                                                 0",
  read
                            1
                   " 0 0 0 x
                                      x a10 a9 a8",
                   " a7 a6 a5 a4
                                      a3 a2 a1 a0",
                     0
                         0
                             0
                                0
                                      0
                                         0
                                                 o";
                                      0 0
  write
                = " 1
                       1
                            0
                                0
                                             0
                   " 0
                        0
                            0 x
                                      x a10 a9 a8",
                   " a7 a6
                                      a3 a2 a1
                                                 a0",
                            a5 a4
                         i
                             i
                                i
                                       i
                                          i
                                             1",
             = " 1
                         0
                             0
                                      0
                                         0
                     1
                                   0
  loadpage_lo
                " 0
                    0
                          0
                             0
                                   0 0
                                         0
                                            0",
                " 0
                                   0 a2 a1 a0",
                     0 0
                             Λ
                     i i
                             i
                                      i
                                         i i";
                                             0",
              = " 1 1 0
                             0
                                   0 0 1
  writepage
                " 0 0 x x
                                   x a10 a9 a8",
                " a7 a6 a5 a4
                                  a3 0 0
                                              0",
                " x
                                   х х х
                                             x";
                     х х
                            х
              = 0x41;
  mode
              = 20;
  delay
             = 8;
  blocksize
  readsize
             = 256;
memory "flash"
   paged
                 = yes;
   size
                 = 65536;
                 = 256;
   page size
                = 256;
   num pages
   min_write_delay = 4500;
   max_write_delay = 4500;
                = 0xff;
   readback_p1
   readback_p2
                 = 0xff;
   read lo
                 = " 0
                         0 1
                               0
                                       0 0
                                              0
                                                  0",
                                     all al0 a9
                                                 a8",
                   "a15 a14 a13 a12
                   " a7 a6 a5 a4
                                                 a0",
                                     a3 a2
                                             a1
```

```
0
                          0
                              0
                                                   0";
                                 0
                                        0 0
                  = " 0 0 1 0
                                       1 0 0 0",
   read hi
                   "a15 a14 a13 a12
                                      all al0 a9 a8",
                    " a7 a6 a5 a4
                                      a3 a2 a1 a0",
                    " 0 0 0 0
                                       0 0 0 0";
                  = " 0
                                                  0",
   loadpage_lo
                         1
                              0
                                 0
                                       0 0
                                              0
                                                  x",
                            0
                                              x
                    " 0 0
                                x
                                       х х
                    " x a6 a5 a4
                                      a3 a2 a1 a0",
                   " i
                         i
                            i
                                i
                                       i i
                                              i
                                                  i":
                  = " 0
                          1
                              0
                                 0
                                        1
                                           0
                                              0
                                                  0",
   loadpage hi
                    " 0 0
                            0
                                       х х
                                              x
                                х
                                                  x",
                    " x a6 a5 a4
                                       a3 a2 a1 a0",
                    " i
                         i
                            i
                                i
                                       i i i i";
                                                  0",
                  = " 0
                         1
                            0
                                 0
                                       1
                                          1
                                              0
   writepage
                                      all al0 a9 a8",
                   "a15 a14 a13 a12
                                     x x x x", x x";
                    " а7 х х х
                   " x x x x
              = 0x41;
  mode
              = 6;
  delay
              = 256;
  blocksize
  readsize
             = 256;
memory "lfuse"
   size
                  = 1;
   write
                  = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
                   "x x x x x x x x i i i i i i i i;
                  = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0,
   read
                   "x x x x x x x x 0 0 0 0 0 0 0 0";
   min write delay = 9000;
   max_write_delay = 9000;
memory "hfuse"
   size
                  = 1;
                  = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0",
   write
                   "xxxx xxxx iiii iiii";
                  = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
   read
                  "x x x x x x x x o o o o o o o o";
   min write delay = 9000;
   max write delay = 9000;
memory "efuse"
   size
                  = 1;
                  = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
   write
                   "x x x x x x x x x x x i i i i";
                   = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0", \\ "x x x x x x x x x x 0 0 0 0 0 0; \\
   read
   min_write_delay = 9000;
   max write delay = 9000;
memory "lock"
   size
                  = 1;
                  = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
   read
                   "x x x x x x x x x x o o o o o o";
                  = "1 0 1 0 1 1 0 0 1 1 1 1 x x x x x x",
"x x x x x x x x x 1 1 i i i i i;;
   write
   min_write_delay = 9000;
   max write delay = 9000;
```

```
memory "calibration"
                     = 1;
      size
                      = "0 0 1 1 1 0 0 0 0 0 0 x x x x x",
       read
                        ;
   memory "signature"
                      = 3;
      size
       read
                      = "0 0 1 1 0 0 0 0
                                                x x x x x x x x",
                       "x x x x x x a1 a0
                                                0 0 0 0 0 0 0 0";
     ;
#-----
# AT90CAN32
part
   id
                   = "c32";
   desc
                  = "AT90CAN32";
   has_jtag
                   = yes;
   stk500 devcode = 0xB3;
   avr910_devcode = 0x43;
signature = 0x1e 0x95 0x81;
   chip erase delay = 9000;
                   = 0xD7;
   pagel
   bs2
                   = 0xA0;
   reset
                   = dedicated;
                   = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
   pgm enable
                    "x x x x x x x x x x x x x x x x";
                   = "1 0 1 0 1 1 0 0
                                        100x xxxx",
   chip_erase
                     "x x x x x x x x
                                       xxxx xxxx";
                  = 200;
   timeout
   stabdelay
                  = 100;
                        = 25;
   cmdexedelay
                        = 32;
   synchloops
                  = 0;
   bytedelay
   pollindex
                  = 3;
                  = 0x53;
   pollvalue
   predelay
                  = 1;
   postdelay
                  = 1;
   pollmethod
                        = 1;
   pp_controlstack
       0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
       0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
       0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x01;
   hventerstabdelay = 100;
   progmodedelay
                     = 0;
   latchcycles
                     = 6;
                     = 0;
   togglevtg
   poweroffdelay
                     = 0;
                     = 0;
   resetdelayms
   resetdelayus
                     = 0;
                    = 15;
   hvleavestabdelay
   chiperasepulsewidth = 0;
   chiperasepolltimeout = 10;
   programfusepulsewidth = 0;
   programfusepolltimeout = 5;
   programlockpulsewidth = 0;
   programlockpolltimeout = 5;
   idr
                      = 0x31;
                      = 0x57;
   spmcr
                      = 0x3b;
   rampz
```

```
= 0x3f:
eecr
allowfullpagebitstream = no;
ocdrev
                = 3;
memory "eeprom"
               = no; /* leave this "no" */
  paged
             = 8; //
= 1024;
   page_size
               = 8; /* for parallel programming */
   size
  min_write delay = 9000;
  max write delay = 9000;
              = 0xff;
   readback_p1
  readback_p2
                = 0xff;
               = " 1 0
                                 0 0 0
                          1
                             0
                                             0",
  read
                 " 0 0 0 x
                                  х х а9 а8",
                  " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                  " 0 0
                                   0 0 0 0";
                          0 0
               = " 1
                                   0 0
                                         0
                                             0",
  write
                      1
                          0
                             0
                 " 0
                      0
                          0
                             x
                                   x x a9 a8",
                  " a7 a6
                         a5 a4
                                   a3 a2 a1 a0",
                    i
                       i
                           i
                             i
                                   i
                                      i
                                         i
  loadpage lo = " 1
                   1
                       0
                           0
                                0
                                   0
                                       0
                                          1",
              " 0
                   0
                                   0 0 0",
                       0
                           0
                                0
              " 0
                   0 0
                           0
                               0 a2 a1 a0",
              " i
                   i i i
                                i i i i";
  writepage
             = " 1
                    1
                       0
                           0
                                0
                                   0
                                      1
                                         0",
              " 0
                   0
                                   x a9 a8",
                       x
                          x
                                x
              " a7 a6 a5 a4
                                a3 0 0 0",
              " x x x x
                                x x x x";
            = 0x41;
  mode
            = 20;
  delay
 blocksize
            = 8;
  readsize
           = 256;
memory "flash"
               = yes;
  paged
               = 32768;
   size
             = 256;
= 128;
   page size
   num_pages
   min write delay = 4500;
   max_write_delay = 4500;
   readback_p1 = 0xff;
   readback_p2
                = 0xff;
   read lo
                = " 0
                      0 1 0
                                   0 0
                                         0
                                             0",
                 "a15 a14 a13 a12
                                  all al0 a9
                                             a8",
                  " a7 a6 a5 a4
                                             a0",
                                   a3 a2 a1
                  " 0
                                             o";
                      0
                          0
                             0
                                   0 0
                = " 0 0 1 0
                                             0",
   read hi
                                   1 0 0
                  "a15 a14 a13 a12
                                  a11 a10 a9
                                            a8",
                  " a7 a6 a5 a4
                                  a3 a2
                                          a1
                                             a0",
                  " 0
                                             o";
                      0
                          0
                             0
                                   0
                                      0
                                          0
                         0
   loadpage lo
                = " 0 1
                             0
                                   0 0 0
                                             0",
                                             x",
                  " 0 0
" x a6
                         0
                             ж
                                   x x x a a 3 a 2 a 1
                          a5
                                             a0",
                             a4
                       i
                              i
                                    i
                                       i
                                             i";
   loadpage_hi
                = " 0
                      1
                           0
                              0
                                   1
                                       0
                                         0
                                             0",
                                            x",
                   0 0
                         0 x
                                   x x
                                         x
                  11
                    x a6
                                            a0",
                          a5 a4
                                   a3 a2 a1
                    i
                       i
                          i
                              i
                                   i
                                       i
                                          i
                                              i";
                = " 0 1 0 0
                                   1 1 0 0",
   writepage
```

```
"a15 a14 a13 a12
                                        all al0 a9 a8",
                      mode = 6;
delay = 6;
blocksize = 256;
deize = 256;
                = 0x41;
   memory "lfuse"
                    = 1;
      size
                     = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
      write
                     "x x x x x x x x i i i i i i i i;
                     = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
                      "x x x x x x x x 0 0 0 0 0 0 0 0";
      min write delay = 9000;
      max_write_delay = 9000;
   memory "hfuse"
      size
                    = 1;
                    = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
      write
                     "x x x x x x x x i i i i i i i i;
                     = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
                     "x x x x x x x x o o o o o o o o";
      min write delay = 9000;
      max write delay = 9000;
   memory "efuse"
                    = 1;
      size
                    = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
      write
                      "x x x x x x x x x x x x i i i i";
                    = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
                     "x x x x x x x x o o o o o o o o";
      min write delay = 9000;
      max write delay = 9000;
   memory "lock"
                    = 1;
      size
                    = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
                      "x x x x x x x x x x o o o o o o";
                    = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
      write
                     "x x x x x x x x 1 1 i i i i i i ";
      min write delay = 9000;
      max_write_delay = 9000;
   memory "calibration"
                   = 1;
      size
                     = "0 0 1 1 1 0 0 0 0 0 0 x x x x x",
      read
                      memory "signature"
                    = 3;
     size
                    = "0 0 1 1 0 0 0 0 x x x x x x x x x x,",
      read
                      "x x x x x x a1 a0 0 0 0 0 0 0 0";
    ;
# ATmega16
```

```
#-----
part
         id
                                                   = "m16";
                                                  = "ATmega16";
          desc
          has_jtag
                                                  = yes;
         stk500_devcode
                                                 = 0x82;
          avr910 devcode
                                                   = 0x74;
                                                   = 0x1e 0x94 0x03;
          signature
                                                   = 0xd7;
          pagel
          bs2
                                                   = 0xa0;
          chip_erase_delay = 9000;
                                                   = "1 0 1 0 1 1 0 0
                                                                                                           0 1 0 1 0 0 1 1",
          pgm_enable
                                                                                                           xxxx xxxx";
                                                         "x x x x x x x x
                                                   = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
          chip erase
                                                        "x x x x x x x x x x x x x x x x";
                                                 = 200;
          timeout
                                                 = 100;
          stabdelay
          cmdexedelay
                                                                  = 25;
          synchloops
                                                                  = 32;
                                                 = 0;
         bytedelay
                                                 = 3;
          pollindex
                                                 = 0x53;
          pollvalue
                                                = 1;
          predelay
                                                 = 1;
          postdelay
                                                                  = 0;
          pollmethod
          pp_controlstack
                0 \\  \  \, x4E \,, \  \, 0 \\  \  \, x5E \,, \  \, 0 \\  \  \, x4F \,, \  \, 0 \\  \  \, x5F \,, \  \, 0 \\  \  \, x6E \,, \  \, 0 \\  \  \, x7E \,, \  \, 0 \\  \  \, x6F \,, \  \, 0 \\  \  \, x7F \,, \  \, 0 \\  \  \, x7F \,, \  \, 0 \\  \  \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \  \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \ \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\  \ \, x8F \,, \  \, 0 \\
                hventerstabdelay
                                                          = 100;
                                                         = 100;
          progmodedelay
          latchcycles
                                                          = 6;
          togglevtg
                                                          = 0;
                                                          = 0;
          poweroffdelay
         resetdelayms
                                                          = 0;
          resetdelayus
                                                          = 0;
          hvleavestabdelay
                                                          = 15;
                                                         = 15;
          resetdelay
          chiperasepulsewidth = 0;
          chiperasepolltimeout = 10;
          programfusepulsewidth = 0;
          programfusepolltimeout = 5;
          programlockpulsewidth = 0;
          programlockpolltimeout = 5;
          idr
                                                           = 0x31;
                                                           = 0x57;
          allowfullpagebitstream = yes;
          ocdrev
                                                           = 2;
          memory "eeprom"
                                                           = no; /* leave this "no" */
                   paged
                                                       = 4; /* for parallel programming */
                   page size
                                                          = 512;
                   min write delay = 9000;
                   max_write_delay = 9000;
                    readback_p1
                                                          = 0xff;
                   readback_p2
                                                          = 0xff;
                read
                                                        = " 1 0
                                                                                        1
                                                                                                  0
                                                                                                                   0 0
                                                                                                                                       0
                                                                                                                                                 0",
                                                                " 0 0 x x
                                                                                                                    x x a9 a8",
                                                                " a7 a6
                                                                                        a5 a4
                                                                                                                    a3 a2
                                                                                                                                                  a0",
                                                                                                                                        a1
                                                                                 0
                                                                                          0
                                                                                                    0
                                                                                                                     0
                                                                                                                   0 0 0
                                                                                                                                                 0",
                                                        = " 1 1
                                                                                       0 0
                write
```

```
x a9 a8",
a3 a2 a1 a0",
                  " 0
                        0
                           х
                              х
                  " a7
                          a5 a4
                       a6
                  " i
                                              i";
                       i
                           i
                              i
                                    i
                                       i
                                          i
            = " 1 1
                        0
                            0
                                 0
                                    0 0
                                          1",
  loadpage_lo
               " 0
                                     0 0 0",
                   0
                                 0
                        0
                           0
               11
                 0
                        0
                           0
                                     0 a1 a0",
                    0
                                 0
                i
                    i
                        i
                           i
                                 i
                                    i
                                        i
                                           i";
             = " 1
                        0
                           0
                                 0 0 1 0",
                   1
  writepage
               " 0
               " 0 0 x x
" a7 a6 a5 a4
                                 х х а9 а8",
                                a3 a2 0 0",
               " x
                                х х х
                                          x";
                    х х
                          x
             = 0x04;
  mode
  delay
             = 10;
  blocksize
             = 128;
  readsize
            = 256;
memory "flash"
  paged
               = yes;
                = 16384;
   size
   page size
                = 128;
   num_pages = 128;
   min_write_delay = 4500;
   max_write_delay = 4500;
   readback_p1 = 0xff;
   readback_p2
                = 0xff;
                        0 1 0
                                    0 0 0
   read lo
                = " 0
                                              0",
                  " 0 0 a13 a12
                                   all al0 a9 a8",
                  " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                  " 0
                       0
                          0 0
                                    0 0 0
                                              o";
                = " 0
                                    1 0
   read hi
                        0 1
                               0
                                          0
                                              0",
                  " 0 0 a13 a12
                                   all al0 a9 a8",
                  " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                  " 0 0 0 0
                                    0 0 0 0";
                = " 0
                                               0",
   loadpage_lo
                       1
                           0
                              0
                                    0 0
                          x
                  " 0
                                          x
                        0
                              x
                                    x
                                        x
                                              x",
                  " x x a5 a4
                                    a3 a2 a1 a0",
                  " i i
                                               i";
                = " 0
                          0
                              0
                                        0
                                               0",
   loadpage hi
                       1
                                    1
                                          0
                  " 0
                          x
                        0
                              х
                                              x",
                                    x
                                       x
                                           х
                                    a3 a2 a1
                  " x
                       x a5 a4
                                             a0",
                  " i
                       i
                          i
                              i
                                    i
                                       i
                                          i
                                              i";
                = " 0
                       1 0 0
                                    1 1
                                          0
                                              0",
   writepage
                  " 0 0 a13 a12
" a7 a6 x x
                                   a11 a10 a9
                                             a8",
                                   x x x x x x
                                               х",
                          х х
                  " x
                                               x";
                       х
             = 0x21;
  mode
  delay
             = 6;
  blocksize
             = 128;
            = 256;
  readsize
 ;
memory "lock"
                = 1;
   size
                = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
   read
                 "x x x x x x x x x x o o o o o o";
   write
                = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
                 "x x x x x x x x 1 1 i i i i i i ;
   min write delay = 9000;
   max_write_delay = 9000;
```

```
memory "lfuse"
                       = 1;
       size
                       = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0",
       read
                         "x x x x x x x x 0 0 0 0 0 0 0 0";
                       = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
"x x x x x x x x x x ; i i i i i i i;;
       write
       min_write_delay = 9000;
       max_write_delay = 9000;
    memory "hfuse"
                       = 1;
       size
                       = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
       read
                         "x x x x x x x x x 0 0 0 0 0 0 0 0";
                       = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
"x x x x x x x x x x i i i i i i i;;
       write
       min_write_delay = 9000;
       max_write_delay = 9000;
    memory "signature"
                       = 3;
                       = "0 0 1 1 0 0 0 0 x x x x x x x x x x,",
       read
                         "x x x x x x a1 a0 o o o o o o o";
   memory "calibration"
       size
                       = "0 0 1 1 1 0 0 0 0 0 0 x x x x x",
       read
                        "0 0 0 0 0 0 a1 a0 o o o o o o o";
  ;
# ATmega164P
# close to ATmega16
part parent "m16"
         = "m164p";
   id
                    = "ATmega164P";
   desc
                   = 0x1e 0x94 0x0a;
   signature
                  = 0;
= 5;
   progmodedelay
   latchcycles
   togglevtg
                       = 1:
   poweroffdelay = 15
= 1;
                       = 15;
   allowfullpagebitstream = no;
   chip erase delay = 55000;
                      = 3;
   ocdrev
# ATmega324P
# similar to ATmega164P
part
   id
                    = "m324p";
    desc
                    = "ATmega324P";
                   = yes;
   has jtag
    stk500_devcode = 0x82; # no STK500v1 support, use the ATmega16 one
```

```
= 0x74;
avr910_devcode
signature
                = 0x1e 0x95 0x08;
pagel
                = 0xd7;
bs2
                = 0xa0;
chip_erase_delay = 55000;
                = "1 0 1 0 1 1 0 0
                                      0 1 0 1 0 0 1 1",
pgm_enable
                  "x x x x x x x x
                                     xxxx xxxx";
                                      100x xxxx",
                = "1 0 1 0 1 1 0 0
chip_erase
                  "x x x x x x x x x x x x x x x x";
               = 200;
timeout
stabdelay
               = 100;
                      = 25;
cmdexedelay
synchloops
                      = 32;
               = 0;
bytedelay
pollindex
               = 3;
pollvalue
               = 0x53;
predelay
               = 1;
               = 1;
postdelay
pollmethod
                      = 0;
pp_controlstack
   0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F, 0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
    0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
    0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
hventerstabdelay = 100;
progmodedelay
                   = 0;
latchcycles
                   = 5;
                   = 1:
togglevtg
                  = 15;
poweroffdelay
resetdelayms
                   = 1;
                   = 0;
resetdelayus
                 = 15;
hvleavestabdelay
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
                   = 0x31;
spmcr
                   = 0x57;
allowfullpagebitstream = no;
ocdrev
                   = 3;
memory "eeprom"
  paged
                   = no; /* leave this "no" */
   page_size
                   = 4; /* for parallel programming */
    size
                   = 1024;
   min_write_delay = 9000;
   max write delay = 9000;
   readback_p1
                   = 0xff;
   readback_p2
                   = 0xff;
  read
                  = " 1 0
                               1
                                   0
                                         0 0
                                                 0
                                                     0",
                     " 0 0 x x
                                          x a10 a9 a8",
                     " a7 a6 a5 a4
                                          a3 a2 a1 a0",
                     " 0
                               0
                                          0
                                             0
                                                     0",
                  = " 1
                           1
                               0
                                   0
                                          0
                                            0
                                                 0
  write
                     " 0
                                          x a10 a9 a8",
                           0
                               x
                                   x
                     " a7 a6 a5 a4
                                          a3 a2 a1 a0",
                        i
                            i
                                i
                                           i
                                                      i";
                                0
                        1
                            0
                                       0
                                           0
                                              0
                                                   1",
  loadpage lo
                    1
                 11
                    0
                        0
                            0
                                0
                                       0
                                           0
                                              0
                                                   0",
                  "
                                                  a0",
                    0
                        0
                            0
                                0
                                       0
                                           0 a1
                                                  i";
                 11
                    i
                        i
                            i
                                i
                                       i
                                           i
                                              i
```

```
" 1 1 0 0 0 0 1 0",
" 0 0 x x x x a10 a9 a8",
" a7 a6 a5 a4 a3 a2 0 0",
             = " 1 1
  writepage
               " 0
               " x x x x
                                x x x x";
  mode
             = 0x41;
  delay
blocksize = 128;
= 256;
memory "flash"
               = yes;
  paged
   = 3276

= 128;

num_pages = 07
               = 32768;
   size
  page size
   min_write_delay = 4500;
   max_write_delay = 4500;
               = 0xff;
   readback_p1
   readback_p2
               = 0xff;
                = " 0 0 1 0 0 0 0 0",
" 0 a14 a13 a12 a11 a10 a9 a8",
   read lo
                                   a3 a2 a1
                  " a7 a6 a5 a4
                                               a0",
                  " 0
                       0
                           0
                              0
                                    0 0
                                           0
                                               o";
                 = " 0 0 1 0
   read hi
                                    1 0 0 0",
                  " 0 a14 a13 a12
                                   all al0 a9 a8",
                                   a3 a2 a1
                   " a7 a6 a5 a4
                                               a0",
                  " 0
                        0
                           0
                                     0 0
                                               0";
                 = " 0 1 0 0
                                    0 0 0 0",
   loadpage lo
                   " 0 0 x x
                                     x x x x",
                   " x x a5 a4
                                     a3 a2 a1
                                               a0",
                  " i
                        i
                           i
                               i
                                     i
                                        i
                                                i";
                 = " 0 1 0 0
                                    1 0 0 0",
   loadpage hi
                   " 0 0 x x
                                     x x x x",
                   " x x a5 a4
                                     a3 a2 a1 a0",
                  " i
                        i
                            i
                               i
                                     i i i
                                               i";
                                     1 1 0 0",
                 = " 0 1 0 0
   writepage
                  " 0 a14 a13 a12
                                   all al0 a9 a8",
                  " a7 a6 x x x x x x",
" x x x x x x x x";
             = 0x21;
  mode
            = 6;
  delay
  blocksize = 256;
  readsize
             = 256;
memory "lock"
                 = 1;
  size
                 = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0",
   read
                  "x x x x x x x x x x o o o o o o";
                 = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
   write
                  "x x x x x x x x x 1 1 i i i i i i;
  min write delay = 9000;
   max write delay = 9000;
memory "lfuse"
  size
                 = 1;
                read
                  "x x x x x x x x o o o o o o o o";
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
   write
                  "x x x x x x x x i i i i i i i i i;
```

```
min write delay = 9000;
     max write delay = 9000;
   memory "hfuse"
     size
                  = 1;
                  = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
      read
                    "x x x x x x x x o o o o o o o o";
                  = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
      write
                   "x x x x x x x x i i i i i i i i;
     min_write_delay = 9000;
     max write delay = 9000;
   memory "efuse"
     size
                  = 1;
                  = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
      read
                    "x x x x x x x x o o o o o o o o";
      write
                   = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
                   "x x x x x x x x x 1 1 1 1 1 i i i";
     min write delay = 9000;
     max_write_delay = 9000;
   memory "signature"
                   = 3;
     size
                   = "0 0 1 1 0 0 0 0 x x x x x x x x x,
      read
                    "x x x x x x a1 a0 0 0 0 0 0 0 0 ";
   memory "calibration"
     size
                  = 1;
                  = "0 0 1 1 1 0 0 0 0 0 0 x x x x x",
      read
                    ;
#-----
# ATmega324PA
# similar to ATmega324P
part parent "m324p"
  id = "m324pa";
desc = "ATmega324PA";
   signature
                = 0x1e 0x95 0x11;
   ocdrev
                 = 3;
#-----
# ATmega644
#-----
# similar to ATmega164
part
  id
               = "m644";
               = "ATmega644";
   desc
   has_jtag = yes;
stk500_devcode = 0x82; # no STK500v1 support, use the ATmega16 one
  has_jtag
   avr910_devcode = 0x74;
   signature = 0x1e 0x96 0x09;
```

```
= 0xd7:
pagel
                 = 0xa0;
bs2
chip_erase_delay = 55000;
                = "1 0 1 0 1 1 0 0
                                      0 1 0 1 0 0 1 1",
pgm_enable
                  "x x x x x x x x x x x x x x x x";
                = "1 0 1 0 1 1 0 0
                                        100x xxxx",
chip_erase
                   "x x x x x x x x
                                        xxxx xxxx";
                = 200;
timeout
stabdelay
                = 100;
cmdexedelay
                       = 25;
                       = 32;
synchloops
                = 0;
bytedelay
pollindex
               = 3;
pollvalue
                = 0x53;
predelay
                = 1;
postdelay
                = 1;
pollmethod
                       = 0;
pp_controlstack
    0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
   0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x02;
hventerstabdelay = 100;
progmodedelay
                   = 0;
                   = 6;
latchcycles
togglevtg
                   = 0;
poweroffdelay
                   = 0;
                   = 0;
resetdelayms
                  = 0;
resetdelayus
                  = 15;
hvleavestabdelay
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
idr
                    = 0x31;
spmcr
                    = 0x57;
allowfullpagebitstream = no;
ocdrev
                    = 3:
memory "eeprom"
                   = no; /* leave this "no" */
   paged
                  = 8; /* for parallel programming */
   page_size
    size
                   = 2048;
    min write delay = 9000;
    max_write_delay = 9000;
                   = 0xff;
    readback_p1
   readback_p2
                    = 0xff;
                   = " 1 0
                                                       0",
                                    0
                                          0 0
  read
                                1
                                                   0
                      " 0
                      " 0 0 x x
" a7 a6 a5 a4
                                          all al0 a9 a8",
                                          a3 a2
                                                   a1
                                                       a0",
                      " 0
                                                        o";
                            0
                                0
                                     0
                                            0
                                               0
                                                    0
  write
                   = " 1
                          1
                                0
                                    0
                                           0
                                             0
                                                   0
                                                       0".
                      " 0 0
                                          all al0 a9 a8",
                                х х
                      " a7
                           a6
                                a5 a4
                                           a3 a2
                                                   a1
                                                       a0",
                        i
                             i
                                 i
                                     i
                                            i
                                                i
                                                    i
                                                        i";
  loadpage_lo
                = "
                     1
                         1
                             0
                                 0
                                        0
                                           0
                                                0
                                                    1",
                  **
                                              0
                                                   0",
                     0
                         0
                             0
                                 O
                                        0
                                           0
                  "
                     0
                         0
                             0
                                 0
                                        0
                                           a2 a1 a0",
                     i
                         i
                             i
                                 i
                                        i
                                            i
                                                i
                                                    i";
               = " 1 1
                             0
                                0
                                        0
                                           0 1
                                                   0",
  writepage
```

```
all al0 a9
                                              a8",
                " 0 0 x x a11 a10 a9
" a7 a6 a5 a4 a3 0 0
" x x x x x x x
                  0
                      0
                                              0",
                                             x";
  mode
              = 0x41;
             = 10;
  delay
  blocksize
             = 128;
             = 256;
  readsize
memory "flash"
  paged
                 = yes;
                 = 65536;
   size
                = 256;
   page size
              = 256;
   num pages
   min write delay = 4500;
   max_write_delay = 4500;
               = 0xff;
   readback p1
                 = 0xff;
   readback_p2
   read lo
                 = " 0 0 1 0
                                      0 0 0 0",
                   "a15 a14 a13 a12
                                     all al0 a9 a8",
                   " a7 a6 a5 a4
                                     a3 a2 a1 a0",
                   " 0 0 0 0
                                      0 0 0 0";
                  = " 0 0 1 0
                                      1 0 0 0",
   read hi
                   "a15 a14 a13 a12
                                      all al0 a9 a8",
                   " a7 a6 a5 a4
                                     a3 a2 a1 a0",
                   " 0 0 0 0
                                      0 0 0 0";
                  = " 0
                                       0 0
   loadpage lo
                         1
                             0
                                0
                                              0
                                                  0",
                                                  x",
                   " 0 0
                            x
                                       х х х
                                x
                   " x a6 a5 a4
                                      a3 a2 a1 a0",
                   " i
                        i
                            i
                                i
                                      i i i
                                                 i";
                  = " 0
   loadpage hi
                          1
                             0
                                0
                                       1
                                           0
                                              0
                                                  0",
                    " 0 0
                            х х
                                       х х х
                                                 x",
                   " x a6 a5 a4
                                      a3 a2 a1 a0",
                   " i
                        i
                            i
                                i
                                      i i i i";
                  = " 0
   writepage
                         1
                            0
                                 0
                                       1 1
                                                  0",
                                      all al0 a9 a8",
                   "a15 a14 a13 a12
                                     x x x x", x x";
                   " а7 х х х
                   " x x x x
              = 0x21;
  mode
              = 6;
  delay
  blocksize
             = 256;
  readsize
             = 256;
memory "lock"
  size
                 = 1;
                 = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
   read
                   "x x x x x x x x x x o o o o o o";
                  = "1 0 1 0 1 1 0 0 1 1 1 1 x x x x x",
"x x x x x x x x 1 1 i i i i i i;;
   write
   min write delay = 9000;
  max write delay = 9000;
memory "lfuse"
  size
                 = 1;
                 = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
   read
                   "x x x x x x x x o o o o o o o";
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
"x x x x x x x x x i i i i i i i;;
   write
   min_write delay = 9000;
   max write_delay = 9000;
```

```
memory "hfuse"
                  = 1;
     size
                  = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
      read
                    "x x x x x x x x 0 0 0 0 0 0 0 0";
      write
                   = "1 0 1 0 1 1 0 0 1 0 1 0 0 0",
                    "xxxx xxxx iiii iiii";
     min write delay = 9000;
     max write delay = 9000;
   memory "efuse"
     size
                   = 1;
                   = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
      read
                    "x x x x x x x x o o o o o o o o";
                   = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
      write
                    "x x x x x x x x x 1 1 1 1 1 i i i";
     min_write_delay = 9000;
     max_write_delay = 9000;
   memory "signature"
     size
                   = 3;
                   read
   memory "calibration"
     size
                   = 1;
                   = "0 0 1 1 1 0 0 0 0 0 0 x x x x x",
      read
                    # ATmega644P
# similar to ATmega164p
part parent "m644"
                = "m644p";
   id
               = "ATmega644P";
   desc
   signature
               = 0x1e 0x96 0x0a;
   ocdrev
                  = 3;
# ATmega1284P
#-----
# similar to ATmega164p
part
   id
               = "m1284p";
   desc
               = "ATmega1284P";
   has_jtag
                = yes;
   stk500_devcode = 0x82; # no STK500v1 support, use the ATmega16 one
   avr910_devcode = 0x74;
   signature
                = 0x1e 0x97 0x05;
                = 0xd7;
   pagel
               = 0xa0;
   bs2
```

```
chip\_erase\_delay = 55000;
                                           = "1 0 1 0 1 1 0 0
                                                                                                                                          0 1 0 1 0 0 1 1",
pgm enable
                                                                                                                                          xxxx xxxx";
                                                                   "x x x x x x x x
                                                           = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
chip erase
                                                                  timeout
                                                        = 200;
stabdelay
                                                        = 100;
cmdexedelay
                                                                               = 25;
synchloops
                                                                               = 32;
                                                        = 0;
bytedelay
pollindex
                                                        = 3;
                                                       = 0x53;
pollvalue
predelay
                                                       = 1;
postdelay
                                                        = 1;
pollmethod
                                                                               = 1;
pp_controlstack
             0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
              0 \\ \mathbf{x} \\ 4 \\ \mathbf{E} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{E} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ \mathbf
              0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x02;
                                                              = 100;
hventerstabdelay
                                                                    = 0;
progmodedelay
latchcycles
                                                                    = 6;
togglevtg
                                                                 = 1;
                                                                    = 15;
poweroffdelay
resetdelayms
                                                                     = 1;
resetdelayus
                                                                    = 0;
                                                                = 15;
hvleavestabdelay
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
                                                                      = 0x31;
idr
spmcr
                                                                      = 0x57;
allowfullpagebitstream = no;
                                                                      = 3;
ocdrev
memory "eeprom"
                                                                     = no; /* leave this "no" */
             paged
                                                                = 8; /* for parallel programming */
              page size
                                                                    = 4096;
              size
              min_write_delay = 9000;
              max_write_delay = 9000;
              readback_p1
                                                                    = 0xff;
              readback_p2
                                                                     = 0xff;
                                                                  = " 1 0
                                                                                                                             0
                                                                                                                                                    0 0
                                                                                                                                                                                 0
                                                                                                               1
         read
                                                                            " 0 0 x x
                                                                                                                                                   all al0 a9 a8",
                                                                             " a7 a6 a5 a4
                                                                                                                                                  a3 a2 a1 a0",
                                                                                     0
                                                                                                 0
                                                                                                                 0
                                                                                                                                                      0 0
                                                                                                                                                                                                  0";
                                                                                                                               0
                                                                                                                                                                                  0
                                                                 = " 1
                                                                                                1
                                                                                                               0
                                                                                                                             0
                                                                                                                                                    0 0
                                                                                                                                                                                 0
                                                                                                                                                                                               0".
         write
                                                                            " 0 0
                                                                                                                                                   all al0 a9 a8",
                                                                                                               х х
                                                                             " a7 a6
                                                                                                                a5 a4
                                                                                                                                                      a3 a2 a1 a0",
                                                                                                                                                                                  i
                                                                                      i
                                                                                                                                                         i
                                                                                                                                                                    i
                                                                                                                                                                                                  i";
                                                                                                     i
                                                                                                                   i
                                                                                                                                i
                                                                                                                                                                                      1",
                                                        = "
                                                                                                      0
                                                                                                                    0
                                                                                                                                                       0
                                                                                                                                                                        0
          loadpage_lo
                                                                         1
                                                                                       1
                                                                                                                                            0
                                                               " 0
                                                                                       0
                                                                                                      0
                                                                                                                   0
                                                                                                                                            0
                                                                                                                                                      0
                                                                                                                                                                 0
                                                                                                                                                                                 0",
                                                               11
                                                                         0
                                                                                       0
                                                                                                      0
                                                                                                                    0
                                                                                                                                            0
                                                                                                                                                       a2 a1 a0",
                                                                         i
                                                                                                     i
                                                                                                                   i
                                                                                                                                            i
                                                                                                                                                          i
                                                                                                                                                                       i
                                                                                                                                                                                  i";
                                                                                       i
                                                         = "
                                                                     1
                                                                                       1
                                                                                                     0
                                                                                                                   0
                                                                                                                                            0
                                                                                                                                                          0
                                                                                                                                                                        1
                                                                                                                                                                                       0",
          writepage
                                                               " 0
                                                                                                                                                                                   a8",
                                                                                      0
                                                                                                                                     a11 a10 a9
                                                                                                   х
                                                                                                                 х
                                                                                                                                                                                      0",
                                                               " a7 a6 a5
                                                                                                                a4
                                                                                                                                       a3 0
                                                                                                                                                                     0
```

```
" x
                                            x";
                     х
                        х
                            x
                                  х
                                     х х
             = 0x41;
  mode
  delay
             = 10;
 blocksize
             = 128;
  readsize
             = 256;
memory "flash"
                = yes;
  paged
   size
               = 131072;
             = 256;
= 512;
   page size
   num pages
   min write delay = 4500;
   max_write_delay = 4500;
               = 0xff;
   readback p1
   readback_p2
                = 0xff;
   read lo
                 = " 0
                       0
                           1 0
                                     0 0
                                           0
                                               0",
                                   all al0 a9 a8",
                  "a15 a14 a13 a12
                  " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                  " 0 0
                           0 0
                                     0 0
                                           0
                                               o";
                 = " 0 0 1 0
   read hi
                                    1 0
                                           0
                                               0",
                  "a15 a14 a13 a12
                                    all al0 a9
                                               a8",
                  " a7 a6 a5 a4
                                    a3 a2 a1 a0",
                  " 0
                                               o";
                       0
                           0
                                     0
                                        0
                                           0
                               0
                 = " 0
                       1
                              0
                                    0 0
                                           0
                                               0",
                            O
   loadpage_lo
                  " 0
                        0
                           х
                              ж
                                     х
                                        х
                                            х
                                               x",
                                    x x
a3 a2
                  " x a6 a5 a4
                                           a1
                                               a0",
                  " i
                           i
                              i
                                        i
                                           i
                                               i";
                        i
                                     i
                 = " 0
                                               0",
                       1
                           0 0
   loadpage_hi
                                    1
                                        0 0
                    0 0 x x
x a6 a5 a4
                  11
                                    x x x
a3 a2 a1
                                               x",
                  11
                                               a0",
                  " i
                                        i
                                               i";
                        i
                           i
                               i
                                    i
                                           i
                 = " 0 1 0 0
   writepage
                                     1 1 0
                                               0",
                  "a15 a14 a13 a12
                                    all al0 a9 a8",
                  x x x x x x
                                               х",
                                               x";
             = 0x41;
  mode
  delay
             = 10;
  blocksize
             = 256;
  readsize
             = 256;
memory "lock"
                = 1;
  size
   read
                = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
                  "x x x x x x x x x x o o o o o o";
                 = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
                  "x x x x x x x x 1 1 i i i i i i ";
   min_write_delay = 9000;
  max write delay = 9000;
memory "lfuse"
                 = 1;
  size
                 = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0",
   read
                  "x x x x x x x x 0 0 0 0 0 0 0 0";
                 "x x x x x x x x i i i i i i i i;
   min_write delay = 9000;
   max write delay = 9000;
```

```
memory "hfuse"
      size
                    = 1;
                    = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
      read
                     "x x x x x x x x 0 0 0 0 0 0 0 0";
                    = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
      write
                     "x x x x x x x x i i i i i i i i;
      min write delay = 9000;
      max_write_delay = 9000;
   memory "efuse"
      size
                    = 1;
                    = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
      read
                     "x x x x x x x x 0 0 0 0 0 0 0 0";
      write
                    = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
                     "x x x x x x x x 1 1 1 1 1 i i i";
      min write delay = 9000;
      max_write_delay = 9000;
   memory "signature"
                    = 3;
      size
                    = "0 0 1 1 0 0 0 0 x x x x x x x x x",
      read
                     "x x x x x x a1 a0 0 0 0 0 0 0 0";
   memory "calibration"
                   = 1;
     size
                   read
                     ;
 ;
# ATmega162
part
   id
                 = "m162";
   desc
                 = "ATmega162";
             = yes;
   has jtag
   stk500 devcode = 0x83;
   avr910_devcode = 0x63;
   signature = 0x1e 0x94 0x04;
   chip_erase_delay = 9000;
   pagel
                 = 0xd7;
                 = 0xa0;
   bs2
   idr
                 = 0 \times 04:
   spmcr
                 = 0x57;
   allowfullpagebitstream = yes;
                 = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
   pgm enable
                   = "1 0 1 0 1 1 0 0
                                    100x xxxx",
   chip erase
                   "x x x x x x x x x x x x x x x x";
   ocdrev
                   = 2;
   memory "flash"
      paged
                   = yes;
                   = 16384;
      size
      page_size
                  = 128;
```

```
= 128;
           num pages
           min_write delay = 4500;
           max_write_delay = 4500;
           readback_p1 = 0xff;
                                                     = 0xff;
           readback_p2
                                                       = " 0
                                                                                0
                                                                                       1 0
                                                                                                                        0 0
                                                                                                                                                         0",
           read lo
                                                                                                                                            0
                                                            " 0
                                                                              0 a13 a12
                                                                                                                    a11 a10
                                                                                                                                             a9
                                                                                                                                                        a8",
                                                             " a7 a6 a5 a4
                                                                                                                    a3 a2 a1 a0",
                                                           " 0
                                                                                                                                                          0";
                                                                              0
                                                                                         0
                                                                                                                        0 0
                                                                                                                                             0
                                                                                                      0
                                                       = " 0
                                                                                0 1
                                                                                                    0
                                                                                                                       1 0
                                                                                                                                                         0",
           read hi
                                                                                                                                            0
                                                            " 0
                                                                             0 a13 a12
                                                                                                                    a11 a10
                                                                                                                                                        a8",
                                                                                                                                             a9
                                                             " a7 a6 a5 a4
                                                                                                                                                        a0",
                                                                                                                     a3 a2
                                                                                                                                             a1
                                                            " 0
                                                                                                                       0
                                                                                                                                                         o";
                                                                              0
                                                                                         0
                                                                                                      0
                                                                                                                                 0
                                                                                                                                               0
                                                       = " 0
                                                                                                                                                          0",
                                                                                                      0
                                                                                                                        0
                                                                                                                               0
                                                                               1
                                                                                           0
                                                                                                                                            0
           loadpage lo
                                                             "
                                                                    0
                                                                               0
                                                                                                                                                          x",
                                                                                         х
                                                                                                    х
                                                                                                                         х
                                                                                                                                   х
                                                                                                                                              х
                                                                                                                       x x
a3 a2
                                                             11
                                                                                        a5 a4
                                                                    x
                                                                               x
                                                                                                                                             a1
                                                                                                                                                         a0",
                                                            " i
                                                                                                                                                         i";
                                                                                                                                 i
                                                                                                                                            i
                                                                               i
                                                                                        i
                                                                                                   i
                                                                                                                       i
                                                      = " 0
           loadpage_hi
                                                                            1
                                                                                     0 0
                                                                                                                         1
                                                                                                                                   0 0
                                                                                                                                                           0",
                                                                   0
                                                                                                                                                         x",
                                                                               0
                                                                                                                       x x x
a3 a2 a1
                                                                                       х х
                                                             "
                                                                               x a5 a4
                                                                                                                                                        a0",
                                                                    x
                                                            " i
                                                                               i
                                                                                        i
                                                                                                    i
                                                                                                                       i
                                                                                                                                 i
                                                                                                                                            i
                                                                                                                                                         i";
           writepage
                                                       = " 0 1 0 0
                                                                                                                       1 1 0
                                                                                                                                                           0",
                                                            " 0 0 a13 a12
                                                                                                                    all al0 a9 a8",
                                                                                                                    х х
х х
                                                             " a7 a6
                                                                                       х х
                                                                                                                                              х
                                                                                                                                                          x",
                                                                                       x
                                                            " x
                                                                             x
                                                                                                                                                           x";
                                       = 0x41;
        mode
                               = 10;
delay
blocksize = 128;
readsize = 256;
timeout
                                           = 200;
                                        = 100;
stabdelay
cmdexedelay
                                                              = 25;
synchloops
                                                               = 32;
                                           = 0;
bytedelay
                                           = 3;
pollindex
pollvalue
                                           = 0x53;
predelay
                                           = 1;
postdelay
                                            = 1;
pollmethod
                                                              = 0;
pp_controlstack
           0 \\  \  \, x0 \\  \  \, E \,, \quad 0 \\  \  \, x1 \\  \  \, E \,, \quad 0 \\  \  \, x2 \\  \  \, F \,, \quad 0 \\  \  \, x2 \\  \  \, E \,, \quad 0 \\  \  \, x3 \\  \  \, E \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \ \, x3 \\  \  \, F \,, \quad 0 \\  \ \, x3 \\  \  \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \
           0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
           0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
hventerstabdelay = 100;
                                                     = 0;
progmodedelay
latchcycles
                                                     = 6;
togglevtg
                                                      = 0;
                                                   = 0;
poweroffdelay
                                                     = 0;
resetdelayms
                                                 = 0;
= 15;
resetdelayus
hvleavestabdelay
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
memory "eeprom"
                                                      = no; /* leave this "no" */
          paged
```

```
= 4; /* for parallel programming */
   page_size
                = 512;
   size
   min write delay = 9000;
   max_write_delay = 9000;
   readback_p1 = 0xff;
   readback_p2
               = 0xff;
                       = " 1
                              0
                                  1 0
                                           0 0 0
                                                      0",
                  " 0 0 x
                                   x x a9 a8",
                             x
                  " a7 a6 a5 a4
                                    a3 a2 a1 a0",
                    0
                        0
                          0
                              0
                                    0 0
                                          0
                                              0";
                       = "
                                              0 0
          write
                               1
                                  0 0
                                          0
                                                      0",
                           1
                  " 0
                                    x x a9 a8",
                       0
                          х
                              x
                  " a7 a6
                                    a3 a2 a1 a0",
                          a5 a4
                    i
                       i
                          i
                              i
                                    i
                                       i i i";
  loadpage_lo
            = "
                 1
                    1
                        0
                           0
                                 0
                                     0
                                        0
                                           1",
               " 0
                                    0 0
                                          0",
                    0
                        0
                           0
                                 0
               " 0
                        0
                   0
                                 0 0 a1 a0",
                           0
               " i
                        i
                           i
                                          i";
             = " 1
                    1
                        0
                           0
                                 0
                                    0
                                          0",
  writepage
                                       1
               " 0
                                    х а9
                    0
                       x
                                 x
                                          a8",
                          х
               " a7 a6 a5 a4
                                a3 a2 0 0",
               " x
                          x
                                x x x x";
                       х
                    x
             = 0x41;
  mode
  delay
             = 20;
  blocksize
             = 4;
           = 256;
  readsize
memory "lfuse"
   size
                = 1;
   min_write_delay = 16000;
   max_write_delay = 16000;
   read
                = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
                  = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
   write
                 "xxxx xxxx iiii iiii";
   ;
memory "hfuse"
   size
                = 1;
   min write delay = 16000;
   max write delay = 16000;
                = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
   read
                  "x x x x x x x x o o o o o o o o";
                = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
   write
                 "xxxx xxxx iiii iiii";
memory "efuse"
   size
   min write delay = 16000;
   max write delay = 16000;
                = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
   read
                  "x x x x x x x x 0 0 0 0 0 0 0 0";
   write
                = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
                  "x x x x x x x x x 1 1 1 1 1 i i i";
memory "lock"
   size
                = 1;
```

```
min_write_delay = 16000;
       max write delay = 16000;
                      = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
       read
                        "x x x x x x x x x x o o o o o o";
                      = "1 0 1 0 1 1 0 0 1 1 1 x x x x x x",
"x x x x x x x x x 1 1 i i i i i i;
       write
   memory "signature"
                      = 3;
       size
                      = "0 0 1 1 0 0 0 0
                                                0 0 x x x x x x",
       read
                        "x x x x
                                    x x a1 a0 o o o o o o o";
   memory "calibration"
       size
                      = 1;
       read
                      = "0 0 1 1 1 0 0 0 0 0 x x x x x x",
                       ;
#-----
# ATmega163
#-----
part
   id
                   = "m163";
   desc
                   = "ATmega163";
   stk500 devcode = 0x81;
   avr910 devcode = 0x64;
   signature = 0x1e 0x94 0x02;
   chip erase delay = 32000;
                   = 0xd7:
   pagel
   bs2
                   = 0xa0;
                   = "1 0 1 0 1 1 0 0
                                        0 1 0 1 0 0 1 1",
   pgm_enable
                                        x x x x x x x x";
                     "x x x x x x x x
                   = "1 0 1 0 1 1 0 0 1 0 0 0 0 0 0 0",
   chip_erase
                     "xxxx xxxx xxxx xxxx";
                      = 200;
   timeout
   stabdelay
                    = 100;
   cmdexedelay
                     = 25;
                      = 32;
   synchloops
   bytedelay
                      = 0;
   pollindex
                      = 3;
   pollvalue
                      = 0x53;
                      = 1;
   predelay
   postdelay
                      = 1;
   pollmethod
                      = 0;
   pp_controlstack
       0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
       {\tt 0x4E}\,,\ {\tt 0x5E}\,,\ {\tt 0x4F}\,,\ {\tt 0x5F}\,,\ {\tt 0x6E}\,,\ {\tt 0x7E}\,,\ {\tt 0x6F}\,,\ {\tt 0x7F}\,,
       0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
   hventerstabdelay = 100;
                     = 0;
   progmodedelay
   latchcycles
                     = 0;
                      = 0;
   togglevtg
   poweroffdelay
                      = 0;
   resetdelayms
                      = 0;
   resetdelayus
                      = 0:
   hvleavestabdelay = 15;
```

```
chiperasepulsewidth = \overline{0;}
 chiperasepolltimeout = 30;
programfusepulsewidth = 0;
programfusepolltimeout = 2;
programlockpulsewidth = 0;
programlockpolltimeout = 2;
memory "eeprom"
                 = 512;
   size
    min write delay = 4000;
   max_write_delay = 4000;
               = 0xff;
    readback_p1
                 = 0xff;
    readback_p2
                 = " 1 0
                                                0",
   read
                            1
                               0
                                     0 0
                   " x x x x
                                     х х х а8",
                   " a7 a6 a5 a4
                                      a3 a2 a1 a0",
                   " 0
                        0
                            0
                               0
                                      0 0 0 0";
                 = " 1 1
                            0
                               0
                                     0 0 0
                                                0",
   write
                   " x x x x
                                     x x x a8",
                   " a7 a6 a5 a4
                                     a3 a2 a1 a0",
                   " i i i i
                                     i i i i";
    mode
                  = 0x41;
                 = 20;
    delay
    blocksize
                 = 4;
    readsize
                 = 256;
memory "flash"
                = yes;
   paged
                 = 16384;
    size
    page_size
                = 128;
    num_pages
                 = 128;
    min_write_delay = 16000;
    max_write_delay = 16000;
    readback_p1 = 0xff;
    readback_p2
                 = 0xff;
                  = " 0
                         0
                            1 0
                                      0 0
                                            0
                                                0",
    read lo
                   " x
                        x
                            x a12
                                     a11 a10
                                             a9
                                                a8",
                   " a7 a6 a5 a4
                                                a0",
                                      a3 a2
                                             a1
                   " 0
                                                 0";
                             0
                         0
                                0
                                      0 0
                                             0
                  = " 0 0
                                                0",
                                            0
    read hi
                            1 0
                                      1 0
                   " x x x a12
" a7 a6 a5 a4
                                     a11 a10 a9
                                                a8",
                                     a3 a2
                                                a0",
                                             a1
                   " 0
                         0
                            0
                                0
                                      0 0
                                            0
                                                 0";
                                                 0",
                  = " 0 1
    loadpage_lo
                             0
                               0
                                      0 0 0
                                                x",
                            x
                               х
                     х х
                                      х х х
                      x
                   11
                         x
                            a5
                                a4
                                      a3 a2
                                             a1
                                                a0",
                   " i
                          i
                             i
                                i
                                       i
                                          i
                                             i
                                                 i";
    loadpage hi
                  = " 0 1
                             0
                                0
                                      1
                                          0
                                            0
                                                 0",
                                                x",
                     х х х
                               x
                                      х х
                                            x
                   **
                      x x a5 a4
                                      a3 a2 a1
                                                a0",
                      i
                          i
                             i
                                i
                                      i
                                          i
                                             i
                                                 i";
                                                 0",
                  = " 0 1
                             0 0
    writepage
                                      1 1
                   " х х х а12
                                     a11 a10 a9
                                                a8",
                                                x",
                   " a7 a6
                            х х
х х
                                     x x x x x x
                      х
                         x
                                                 x";
              = 0x11;
   mode
   delay
              = 20;
   blocksize
              = 128;
   readsize
             = 256;
memory "lfuse"
```

```
= 1:
       size
      min write delay = 2000;
      max_write_delay = 2000;
                   = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
      read
                      "x x x x x x x x o o o o o";
                   = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
"x x x x x x x x i i 1 1 i i i i";
      write
   memory "hfuse"
      size
                    = 1;
      min write delay = 2000;
      max_write_delay = 2000;
                   = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
      read
                     "x x x x x x x x x x x 1 o o o";
                    = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
"x x x x x x x x x 1 1 1 1 1 i i i";
      write
   memory "lock"
      size
                    = 1:
      min write delay = 2000;
      max_write_delay = 2000;
                   = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
      read
                     "x x x x 0 x x x x x x 0 0 0 0 0 0";
                     "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
"x x x x x x x x 1 1 i i i i i i;;
      write
                    = "1 0 1 0 1 1 0 0
   memory "signature"
                    = 3;
      size
                    read
   memory "calibration"
      size
                    = 1;
                    = "0 0 1 1 1 0 0 0 xxxx xxxx",
      read
                     #-----
# ATmega169
           -----
part
   id
                 = "m169";
   desc
                 = "ATmega169";
              = yes;
   has_jtag
   stk500 devcode = 0x85;
   avr910_devcode = 0x78;
                 = 0x1e 0x94 0x05;
   signature
   chip erase delay = 9000;
                 = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
   pgm_enable
                   "x x x x x x x x x x x x x x x x";
                 = "1 0 1 0 1 1 0 0
                                    1000 0000",
   chip_erase
                   "x x x x x x x x
                                    xxxx xxxx";
                 = 200;
   timeout
                 = 100;
   stabdelay
   cmdexedelay
                      = 25;
                      = 32;
   synchloops
   bytedelay
                 = 0;
   pollindex
                = 3;
                 = 0x53;
   pollvalue
   predelay
                 = 1;
```

```
postdelay
 pollmethod
                     = 1;
pp_controlstack
    0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
    0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
    0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
                 = 100;
hventerstabdelay
 progmodedelay
                  = 0;
 latchcycles
                  = 5;
                  = 1;
 togglevtg
 poweroffdelay
                  = 15;
                  = 1;
 resetdelayms
 resetdelayus
                 = 0;
 hvleavestabdelay = 15;
 chiperasepulsewidth = 0;
 chiperasepolltimeout = 10;
 programfusepulsewidth = 0;
 programfusepolltimeout = 5;
programlockpulsewidth = 0;
 programlockpolltimeout = 5;
                   = 0x31;
 spmcr
                   = 0x57;
 ocdrev
                   = 2;
memory "eeprom"
                  = no; /* leave this "no" */
   paged
               = 4; /* for parallel programming */
    page size
                  = 512;
    size
    min write delay = 9000;
    max_write_delay = 9000;
                 = 0xff;
    readback p1
                  = 0xff;
    readback_p2
                  = " 1 0
   read
                             1
                                 0
                                        0 0
                    " x x x x
                                        х х х а8",
                     " a7 a6 a5 a4
                                        a3 a2 a1 a0",
                       0
                          0
                              0
                                  0
                                         0
                                            0
                                               0
                                                    o";
                                                   0",
                  = " 1 1
                              0
                                 0
                                        0 0
                                               0
   write
                     " x x
                                        х х х а8",
                             x
                                 x
                     " a7 a6 a5 a4
                                        a3 a2 a1 a0",
                       i
                          i
                               i
                                  i
                                         i
                                            i
                                               i
                                                   i";
                                               1",
               = " 1 1
                           0
                               0
                                     0
                                        0 0
   loadpage lo
                                         0 0 0",
                 " 0
                      0
                           0
                               0
                                     0
                 " 0
                                         0 a1 a0",
                      0
                           0
                               0
                                     0
                 **
                   i
                      i i
                               i
                                     i
                                        i
                                            i i";
               = " 1
   writepage
                       1
                           0
                               0
                                     0
                                         0
                                            1
                                                0",
                 " 0
                                            ж а8",
                      0 x
                             х
                                        x
                                     х
                 " a7 a6 a5 a4
                                    a3 a2 0 0",
                       х х
                              х
                                    x x x x";
   mode
               = 0x41;
               = 20;
   delay
   blocksize
              = 4;
   readsize
              = 256;
  ;
 memory "flash"
                  = yes;
   paged
    size
                  = 16384;
                 = 128;
    page size
    num_pages
                  = 128;
    min write delay = 4500;
    max_write_delay = 4500;
    readback p1 = 0xff;
```

```
readback_p2
                  = 0xff:
                         0 1 0
                                                  0",
   read lo
                  = " 0
                                       0 0
                                             0
                   " x x x a12
                                     all al0 a9
                                                 a8",
                   " a7 a6 a5 a4
                                     a3 a2 a1
                                                 a0",
                   " 0
                        0
                            0 0
                                      0 0 0 0";
                  = " 0
   read hi
                         0
                            1
                                0
                                       1 0
                                              0
                                                 0",
                   " x
                                      all al0 a9 a8",
                         x
                             x a12
                    " a7 a6 a5 a4
                                      a3 a2 a1 a0",
                   " 0
                                                  0";
                         0
                             0
                                       0
                                          0
                                              0
                                0
                  = " 0
                         1
                             0
                                0
                                       0
                                          0
                                                  0",
   loadpage_lo
                                              0
                    11
                                          x
                                                  x",
                      x
                         x
                             x
                                x
                                       х
                                              x
                    " x
                                       a3 a2 a1
                                                 a0",
                          x a5 a4
                         i
                             i
                                i
                                       i
                                          i
                                              i
                                                  i";
                  = " 0
                                                  0",
                             0
                                0
                                              Ω
                          1
                                       1
                                          0
   loadpage hi
                      x
                                                  x",
                         x
                             х
                                х
                                       х
                                          х
                                              х
                            x x a5 a4
                                       x x
a3 a2
                    " x
                          x
                                              a1
                                                 a0",
                   " i
                                                 i";
                                              i
                         i
                             i
                                i
                                       i
                                          i
                  = " 0
                                                 0",
   writepage
                        1
                            0 0
                                       1 1 0
                   " x x x a12
" a7 a6 x x
" x x x x
                                      all al0 a9 a8",
                                    x",
                                                  x";
  mode
              = 0x41;
  delay
             = 6;
  blocksize
              = 128;
  readsize
             = 256;
memory "lfuse"
                 = 1;
   size
   min write delay = 2000;
   max_write_delay = 2000;
                = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0",
   read
                   "x x x x x x x x o o o o o o o o";
   write
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
                   "x x x x x x x x i i i i i i i i";
memory "hfuse"
                 = 1:
   size
   min write delay = 2000;
   max_write_delay = 2000;
                = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
   read
                   "x x x x x x x x 0 0 0 0 0 0 0 0";
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 0",
"x x x x x x x x x iiii iiii;
   write
memory "efuse"
                  = 1;
   size
                  = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
   write
                   "x x x x x x x x x x x i i i i i";
                 = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
   read
                   "x x x x x x x x o o o o o o o o";
memory "lock"
                  = 1;
   min write delay = 2000;
   max_write_delay = 2000;
                 = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
   read
                   "x x x x x x x x x x o o o o o o";
```

```
= "1 0 1 0 1 1 0 0
                       "1 0 1 0 1 1 0 0 1 1 1 x x x x x x",
"x x x x x x x x x 1 1 i i i i i i;";
       write
   memory "signature"
                     = 3;
      size
                     = "0 0 1 1 0 0 0 0
       read
                                               0 0 0 x x x x x",
                       "x x x x
                                   x x a1 a0
                                               0 0 0 0
   memory "calibration"
      size
                     = 1;
                                         0 0 0 x x x x x",
                     = "0 0 1 1 1 0 0 0
       read
                       # ATmega329
part
                  = "m329";
   id
                  = "ATmega329";
   desc
   has_jtag = yes;
   stk500_devcode = 0x85; # no STK500 support, only STK500v2
    avr910 devcode = 0x?; # try the ATmega169 one:
   avr910_devcode = 0x75;
   signature
                  = 0x1e 0x95 0x03;
   chip erase delay = 9000;
   pgm_enable = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
                   = "1 0 1 0 1 1 0 0 1 0 0 0 0 0 0 0 0",
   chip_erase
                   = 200;
   timeout
   stabdelay
                 = 100;
   cmdexedelay
                       = 25:
   synchloops
                       = 32;
   bytedelay
                 = 0;
   pollindex
                 = 3;
                 = 0x53;
   pollvalue
                 = 1;
   predelay
   postdelay
                 = 1;
   pollmethod
                       = 1;
   pp controlstack
       0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
       0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
       0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
       0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
   hventerstabdelay = 100;
progmodedelay = 0;
   progmodedelay = 0;
= 5;
   latchcycles
                    = 1;
   togglevtg
                   = 15;
   poweroffdelay
   resetdelayms
resetdelayus
                     = 1;
                   = 0;
   hvleavestabdelay = 15;
   chiperasepulsewidth = 0;
   chiperasepolltimeout = 10;
   programfusepulsewidth = 0;
   programfusepolltimeout = 5;
   programlockpulsewidth = 0;
   programlockpolltimeout = 5;
   idr
                     = 0x31;
   spmcr
                     = 0x57;
   ocdrev
                     = 3;
```

```
memory "eeprom"
                = no; /* leave this "no" */
    paged
             = 4; /* for parallel programming */
= 1024;
    page_size
   size
    min write delay = 9000;
    max_write_delay = 9000;
    readback_p1
                 = 0xff;
                = 0xff;
    readback_p2
                                             0",
                = " 1 0
                          1 0
   read
                                   0 0 0
                  " x x x x
                                   ж ж а9 а8",
                   " a7 a6 a5 a4
                                    a3 a2 a1 a0",
                   " 0
                        0
                           0
                              0
                                    0 0 0
                                              o";
                = " 1 1
                                    0 0
                                          0
   write
                          0
                              0
                                    x x a9 a8",
                   " x x
                          x
                             x
                   " a7 a6 a5 a4
                                    a3 a2 a1 a0",
                     i
                        i
                           i
                              i
                                    i i i
   loadpage_lo = " 1 1
                                          1",
                            0
                                   0 0
                        0
                                0
               " 0 0 0 0
                                 0 0 0 0",
                                0 0 a1 a0",
               " i i i i
                                i i i i";
             = " 1 1 0 0
" 0 0 x x
" a7 a6 a5 a4
                                   0 1 0",
                                0
   writepage
                                ж ж а9 а8",
                                a3 a2 0 0",
               " x x x x
                                x x x x";
   mode
             = 0x41;
             = 20;
   delay
  blocksize
            = 8;
  readsize
            = 256;
memory "flash"
   paged
               = yes;
   size
               = 32768;
            = 128;
= 256;
    page_size
    num pages
    min write delay = 4500;
    max_write_delay = 4500;
    readback_p1 = 0xff;
    readback_p2
                = 0xff;
                 = " 0 0 1 0
" x a14 a13 a12
                                 0 0 0
                                              0",
    read lo
                                   a11 a10
                                          a9
                                              a8",
                   " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                  " 0
                                              o";
                       0
                           0
                              0
                                    0 0
                                          0
    read hi
                 = " 0 0 1
                               0
                                    1 0
                                          0
                                              0",
                   " x a14 a13 a12
                                   all al0 a9
                                              a8",
                   " a7 a6 a5 a4
                                              a0",
                                    a3 a2 a1
                                              0";
                                    0 0
                    0
                       0
                           0
                              0
                                          0
                 = " 0 1 0
                                              0",
                                    0 0 0
                              0
    loadpage_lo
                   11
                                              x",
                    x x x x
x x a5 a4
                                    x x x
a3 a2 a1
                   "
                                              a0",
                       i
                   " i
                          i
                              i
                                    i
                                       i
                                          i
                                              i";
                 = " 0 1 0 0
    loadpage hi
                                    1 0 0
                                             0",
                  x",
                                    x x x a a 3 a 2 a 1
                     x
                                              a0",
                   " i
                        i
                           i
                               i
                                    i
                                        i
                                              i";
    writepage
                 = " 0 1 0 0
                                    1 1 0
                                             0",
                   " ж ж ж а12
                                   all al0 a9 a8",
                   " a7 a6
                          х х
х х
                                   x x x x x x
                                              x",
                   " x x
                                              x";
  mode
             = 0x41;
```

```
delay = 6;
blocksize = 256;
readsize = 256;
   memory "lfuse"
                = 1;
      size
      min write delay = 4500;
      max_write_delay = 4500;
                  = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0",
      read
                    "x x x x x x x x o o o o o o o o";
      write
                  = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
                    "x x x x x x x x i i i i i i i i;
   memory "hfuse"
      size
                   = 1;
      min_write_delay = 4500;
      max_write_delay = 4500;
      read
                  = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
                    "x x x x x x x x 0 0 0 0 0 0 0 0";
                  = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
      write
                    "x x x x x x x x i i i i i i i i;
   memory "efuse"
                   = 1;
      size
      min write delay = 4500;
      max_write_delay = 4500;
                  = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
      read
                    "x x x x x x x x 0 0 0 0 0 0 0 0";
                  = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
      write
                    "x x x x x x x x x x x i i i";
   memory "lock"
      size
                   = 1;
      min write delay = 4500;
      max_write_delay = 4500;
                  = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
      read
                    "x x x x x x x x x x o o o o o o";
      write
                  = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
                     "x x x x x x x x x 1 1 i i i i i i;
   memory "signature"
      size
                   = 3;
                   = "0 0 1 1 0 0 0 0 0 0 0 x x x x x",
      read
                    "x x x x x x a1 a0 o o o o o o o";
   memory "calibration"
                   = 1;
     size
                   = "0 0 1 1 1 0 0 0 0 0 0 x x x x x",
      read
                    #-----
# ATmega329P
#-----
# Identical to ATmega329 except of the signature
part parent "m329"
                = "m329p";
   id
               = "ATmega329P";
   desc
```

```
= 0x1e 0x95 0x0b;
               signature
               ocdrev
                                                                                       = 3;
 # ATmega3290
 #-----
 # identical to ATmega329
part parent "m329"
                                                                          = "m3290";
             id
             id = "m3290";
desc = "ATmega3290";
              desc = "ATmega3290";
signature = 0 \times 1e \ 0 \times 95 \ 0 \times 04;
              ocdrev
                                                                                   = 3;
 #-----
 # ATmega3290P
 #-----
 # identical to ATmega3290 except of the signature
part parent "m3290"
              id
                                                                            = "m3290p";
                                                                           = "ATmega3290P";
               desc
              signature
                                                                       = 0x1e 0x95 0x0c;
                                                                                     = 3;
              ocdrev
 # ATmega649
 #-----
                                                                           = "m649";
              id
               desc
                                                        = ...
= yes;
                                                                           = "ATmega649";
              has_jtag
                stk500 devcode = 0x85; # no STK500 support, only STK500v2
                avr910 devcode = 0x?; # try the ATmega169 one:
              avr910_devcode = 0x75;
signature = 0x1e 0x96 0x03;
               chip erase delay = 9000;
                                                                           = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
              pgm enable
                                                                                 = "1 0 1 0 1 1 0 0
                                                                                                                                                            1000 0000",
               chip_erase
                                                                                 "x x x x x x x x
                                                                                                                                                        xxxx xxxx";
                                                                        = 200;
               timeout
                                                                        = 100;
               stabdelay
               cmdexedelay
                                                                                               = 25;
                                                                                                = 32;
               synchloops
                                                                        = 0;
              bytedelay
               pollindex
                                                                        = 3;
                                                                       = 0x53;
               pollvalue
              predelay
                                                                       = 1;
              postdelay
                                                                       = 1;
              pollmethod
                                                                                               = 1:
              pp controlstack
                            0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
                             0 \\ \mathbf{x} \\ 4 \\ \mathbf{E} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{E} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ \mathbf
                             0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
              hventerstabdelay = 100;
progmodedelay = 0;
              progmodedelay
               latchcycles
                                                                                = 5;
```

```
= 1;
 togglevtg
poweroffdelay
                 = 15;
                = 1;
resetdelayms
resetdelayus
                = 0;
hvleavestabdelay = 15;
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
                 = 0x31;
spmcr
                 = 0x57;
ocdrev
                 = 3;
memory "eeprom"
                = no; /* leave this "no" */
   paged
             = 8; /* for parallel programming */
    page_size
    size
                = 2048;
   min_write_delay = 9000;
   max_write_delay = 9000;
                 = 0xff;
    readback p1
                 = 0xff;
    readback_p2
                 = " 1 0
   read
                           1
                               0
                                     0 0
                                            0
                   " x x x x
                                     x a10 a9 a8",
                   " a7 a6 a5 a4
                                     a3 a2 a1 a0",
                     0
                         0
                            0
                                      0 0
                                            0
                                                0";
                               0
                                     0 0
                                               0",
                = " 1 1
                               0
   write
                            0
                                            0
                   " x x x x
                                     x a10 a9 a8",
                   " a7 a6 a5 a4
                                     a3 a2 a1 a0",
                     i
                         i
                            i
                               i
                                      i i
                                            i
                                                i";
                                            1",
              = " 1
                    1
                         0
                             0
                                     0 0
   loadpage_lo
                                  0
                                     0 0 0",
                " 0
                     0
                         0
                             0
                                 0
                " 0
                     0
                         0
                             0
                                  0 a2 a1 a0",
                "
                                  i
                 i
                     i i
                                            i";
                             i
                                     i
                                         i
              = " 1
   writepage
                      1
                         0
                             0
                                  0
                                     0
                                         1
                                             0",
                " 0
                     0 ж
                                  x a10 a9 a8",
                           x
                " a7 a6 a5 a4
                                  a3 0 0 0",
                     x x x
                                  x x x x";
              = 0x41;
   mode
              = 20;
   delay
             = 8;
   blocksize
   readsize
             = 256;
  ;
memory "flash"
                 = yes;
   paged
    size
                 = 65536;
    page size
                 = 256;
                 = 256;
    num_pages
    min write delay = 4500;
    max_write_delay = 4500;
                = 0xff;
    readback p1
    readback_p2
                 = 0xff;
                                                0",
    read lo
                  = " 0 0 1 0
                                     0 0
                                            0
                   "a15 a14 a13 a12
                                    a11 a10
                                                a8",
                                            a9
                   " a7 a6 a5 a4
                                     a3 a2 a1
                                                a0",
                   " 0
                                                0";
                        0
                            0
                                      0 0
                                            0
                                0
                 = " 0 0 1 0
                                     1 0 0
                                               0",
    read hi
                   "a15 a14 a13 a12
                                    all al0 a9
                                               a8",
                   " a7 a6 a5 a4
                                    a3 a2 a1
                                                a0",
                   " 0
                        0
                                     0 0
                                                0";
                            0 0
                                            0
```

```
= "
                                                   0",
                      0
                                  0
                                        0
                                            0
   loadpage_lo
                          1
                              0
                                                0
                    " x x
" x a6
                                       х х
a3 a2
                                                   x",
                             х
                                 x
                                               x
                                                   a0",
                             a5
                                 a4
                                               a1
                    " i
                         i
                             i
                                 i
                                       i
                                           i
                                              i
                                                   i";
                  = " 0
                                                   0",
                          1
                              0
                                  0
                                           0
                                              0
   loadpage_hi
                                        1
                                       х х
a3 a2
                                                   x",
                      х
                          х
                             х
                                 х
                                               х
                    11
                         a6
                             a5
                                 a4
                                               a1
                                                   a0",
                      х
                    " i
                                              i
                                                   i";
                          i
                              i
                                 i
                                        i
                                           i
                  = " 0 1 0 0
                                                  0",
   writepage
                                        1 1 0
                    " x x x a12
                                      all al0 a9 a8",
                    x x x x x x x
                                                   x",
                                                   x":
  mode
              = 0x41;
  delay = 6;
blocksize = 256;
readsize = 256;
memory "lfuse"
                 = 1;
  size
   min write delay = 4500;
   max_write_delay = 4500;
                = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
   read
                   "x x x x x x x x x 0 0 0 0 0 0 0 0";
   write
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
                   "x x x x x x x x i i i i i i i i;
memory "hfuse"
   size
                 = 1;
   min write delay = 4500;
   max_write_delay = 4500;
                = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
   read
                   "x x x x x x x x o o o o o o o o";
   write
                 = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
                   "x x x x x x x x i i i i i i i i";
memory "efuse"
                  = 1:
   size
   min write delay = 4500;
   max_write_delay = 4500;
                = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
   read
                   "x x x x x x x x 0 0 0 0 0 0 0 0";
   write
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
                   "x x x x x x x x x x x i i i";
memory "lock"
   size
                  = 1:
   min write delay = 4500;
   max_write_delay = 4500;
                 = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
   read
                    "x x x x x x x x x x o o o o o o";
                   "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
"x x x x x x x x 1 1 i i i i i i;
                 = "1 0 1 0 1 1 0 0
   write
memory "signature"
                  = 3;
   size
                  = "0 0 1 1 0 0 0 0
   read
                                            0 0 0 x x x x x",
                   "x x x x x x a1 a0
                                            0 0 0 0 0 0 0 0";
```

```
memory "calibration"
                     = 1;
       size
                     = "0 0 1 1 1 0 0 0 0 0 0 x x x x x",
       read
                       # ATmega6490
#------
# identical to ATmega649
part parent "m649"
   id
                   = "m6490";
                  = "ATmega6490";
   desc
   signature
                 = 0x1e 0x96 0x04;
                     = 3;
   ocdrev
#-----
                  = "m32";
   id
            = "ATmega32";
   desc
   has jtag
                  = yes;
   stk500_devcode = 0x91;
   avr910_devcode = 0x72;
signature = 0x1e 0x95 0x02;
   chip_erase_delay = 9000;
          = 0x\alpha,
= 0xa0;
   pagel
   bs2
   reset
                  = dedicated;
   pgm enable
                 = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
                    "x x x x x x x x x x x x x x x x x ";
                  = "1 0 1 0 1 1 0 0
                                       1000 0000",
   chip_erase
                    = 200;
   timeout
   stabdelay
                  = 100;
   cmdexedelay
                        = 25;
                        = 32;
   synchloops
                  = 0;
   bytedelay
   pollindex
                 = 3;
   pollvalue
                 = 0x53;
   predelay
                  = 1;
   postdelay
                  = 1;
   pollmethod
                        = 0;
   pp_controlstack
       0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
       0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
   hventerstabdelay = 100;
   progmodedelay
                    = 0;
                     = 6;
   latchcycles
                     = 0;
   togglevtg
                     = 0;
   poweroffdelay
   resetdelayms
resetdelayus
                     = 0;
                    = 0;
= 15;
   hvleavestabdelay
   chiperasepulsewidth = 0;
   chiperasepolltimeout = 10;
   programfusepulsewidth = 0;
   programfusepolltimeout = 5;
```

```
programlockpulsewidth = 0;
 programlockpolltimeout = 5;
 idr
                   = 0x31;
                    = 0x57;
 spmcr
 allowfullpagebitstream = yes;
 ocdrev
                   = 2;
memory "eeprom"
                   = no; /* leave this "no" */
    paged
                           /* for parallel programming */
    page_size
                   = 4;
                   = 1024;
    size
    min_write_delay = 9000;
    max_write_delay = 9000;
    readback p1
                  = 0xff;
                   = 0xff;
    readback_p2
    read
                    = " 1
                            0
                                1
                                    0
                                          0
                                              0
                                                 0
                                                      0",
                     " 0
                            0
                                x
                                   x
                                          x
                                              x
                                                 a9
                                                     a8",
                     " a7 a6
                                         a3 a2
                                                     a0",
                               a5 a4
                                                 a1
                     " 0
                                          0
                                                     o";
                            0
                                0
                                    0
                                             0
                                                  0
                    = " 1
                            1
                                0
                                    0
                                          0
                                              0
                                                 0
                                                     0",
    write
                     " 0
                           0
                                   x
                                          x
                                             x
                                                 a9
                                                     a8",
                               х
                     " a7
                                                     a0",
                           a6
                               a5
                                   a4
                                         a3 a2
                                                 a1
                        i
                            i
                                i
                                   i
                                          i
                                             i
                                                 i
                                                     i";
               = "
                            0
                                O
                                          n
                                              O
                                                  1",
   loadpage_lo
                        1
                                      O
                    1
                  11
                    0
                        0
                            0
                                0
                                      0
                                          0
                                              0
                                             a1 a0",
                  11
                    0
                        0
                            0
                                0
                                      0
                                          0
                            i
                                                 i";
                    i
                        i
                                i
                                      i
                                              i
                                          i
                = " 1
   writepage
                        1
                            0
                                0
                                      0
                                          0
                                             1
                                                  0",
                  " 0
                                         x a9 a8",
                       0 x x a6 a5 a4
                        0
                                      х
                  " a7
                                     a3 a2
                                             0
                                                 0",
                                         х х
                                                 x";
                   х
                        x
                           x
                               x
                                      x
   mode
                = 0x04;
   delay
                = 10;
   blocksize
                = 64;
               = 256;
   readsize
 memory "flash"
                   = yes;
    paged
    size
                   = 32768;
                   = 128;
    page size
                  = 256;
    num pages
    min_write_delay = 4500;
    max_write_delay = 4500;
    readback_p1
                   = 0xff;
                   = 0xff;
    readback_p2
                                                     0",
    read lo
                    = " 0
                            0 1 0
                                         0 0
                                                 0
                     " 0
                            0 a13 a12
                                        all al0 a9 a8",
                     " a7 a6 a5 a4
                                                     a0",
                                        a3 a2 a1
                     " 0
                                                     0";
                           0
                               0
                                         0 0
                                    0
                                                 0
                                                     0",
                    = " 0
                            0 1
                                         1 0
    read hi
                                    O
                                                 0
                     " 0
                            0 a13 a12
                                        a11 a10 a9
                                                     a8",
                     " a7 a6 a5 a4
                                         a3 a2
                                                     a0",
                                                     o";
                        0
                            0
                               0
                                    0
                                          0
                                            0
                    = " 0
                                                      0",
                            1
                                0
                                    0
                                          0
                                              0
                                                  0
    loadpage_lo
                     " 0
                            0
                                                     x",
                              х
                                            x
                                                 х
                                   х
                                          х
                     11
                        x
                            x
                              a5 a4
                                         a3 a2 a1
                                                     a0",
                                                      i";
                            i
                                i
                                    i
                                          i
                                             i
                                                 i
                        i
                    = " 0
    loadpage_hi
                            1
                                0
                                    0
                                          1
                                              0
                                                  0
                                                      0",
                      " 0
                                                     x",
                            0
                                                 х
                               х
                                   х
                                          х
                                              x
                                                     a0",
                     11
                        x
                            x
                               a5
                                  a4
                                         a3 a2 a1
```

```
i";
                        i
                            i
                               i
                                   i
                                         i
                                            i
                                                i
                    = " 0 1 0 0
                                                   0",
       writepage
                                        1 1 0
                      " 0 0 a13 a12
                                       all al0 a9 a8",
                      " а7 а6 х х
                                       х х х
                                                  x",
                      " x x x x
                                                  x";
                                        х х х
     mode
                 = 0x21;
                = 6;
     delav
                = 64;
     blocksize
     readsize
                = 256;
   memory "lfuse"
      size
                   = 1;
      min write delay = 2000;
      max_write_delay = 2000;
                    = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0",
"x x x x x x x x x 0 0 0 0 0 0 0";
      write
                    = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
                     "xxxx xxxx iiii iiii";
   memory "hfuse"
      size
                   = 1;
      min write delay = 2000;
      max_write_delay = 2000;
      read
                    = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
                      "x x x x x x x x
                                       0000 0000";
                    = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
      write
                     "xxxx xxxx iiii iiiii";
   memory "lock"
      size
                   = 1;
      min write delay = 2000;
      max_write_delay = 2000;
      read
                    = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
                      "x x x x x x x x x x o o o o o o";
                    = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
      write
                     "x x x x x x x x 1 1 i i i i i i i;
   memory "signature"
     size
                    = 3;
                    read
                      "x x x x x x a1 a0 o o o o o o o";
   memory "calibration"
                    = 4;
      size
                    = "0 0 1 1 1 0 0 0 0 0 x x x x x x,
      read
                      "0 0 0 0 0 0 a1 a0 0 0 0 0 0 0 0";
     ;
# ATmega161
part
   id
                 = "m161";
   desc
                = "ATmega161";
   stk500 devcode
                 = 0x80;
   avr910 devcode
                 = 0x60;
   signature
                 = 0x1e 0x94 0x01;
   chip erase delay = 28000;
```

```
= 0xd7:
    pagel
                                                                  = 0xa0;
    bs2
                                                                  = "1 0 1 0 1 1 0 0
                                                                                                                                                      0 1 0 1 0 0 1 1",
    pgm_enable
                                                                         "x x x x x x x x
                                                                                                                                                     xxxx xxxx";
                                                                                                                                                    1000 0000",
                                                                  = "1 0 1 0 1 1 0 0
    chip_erase
                                                                                                                                                     x x x x x x x x x";
                                                                         "x x x x x x x x
    timeout
                                                               = 200;
                                                               = 100;
    stabdelay
    cmdexedelay
                                                                                       = 25;
    synchloops
                                                                                       = 32;
                                                              = 0;
   bytedelay
                                                              = 3;
    pollindex
                                                              = 0x53;
    pollvalue
   predelay
                                                              = 1;
    postdelay
                                                               = 1;
                                                                                        = 0;
   pollmethod
   pp_controlstack
                  0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
                   0 \\ \mathbf{x} \\ 4 \\ \mathbf{E} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{E} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ \mathbf
                  0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
                                                                      = 100;
    hventerstabdelay
                                                                            = 0;
    progmodedelay
    latchcycles
                                                                           = 0;
    togglevtg
                                                                           = 0;
                                                                           = 0;
    poweroffdelay
    resetdelayms
                                                                            = 0;
    resetdelayus
                                                                            = 0;
                                                                        = 15;
    hvleavestabdelay
    chiperasepulsewidth = 0;
    chiperasepolltimeout = 30;
   programfusepulsewidth = 0;
    programfusepolltimeout = 2;
    programlockpulsewidth = 0;
   programlockpolltimeout = 2;
memory "eeprom"
                                                                            = 512;
                   size
                  min write delay = 3400;
                  max_write_delay = 3400;
                                                                        = 0xff;
                  readback_p1
                  readback_p2
                                                                            = 0xff;
                                                                         = " 1 0
                                                                                                                         1
                                                                                                                                        0
                                                                                                                                                                  0 0
                                                                                                                                                                                                0
                                                                                                                                                                                                               0",
             read
                                                                                     " x
                                                                                                                         х
                                                                                                                                        х
                                                                                                                                                                                х х
                                                                                                                                                                                                             a8",
                                                                                                         x
                                                                                                                                                                    x
                                                                                     " a7 a6 a5 a4
                                                                                                                                                                   a3 a2 a1
                                                                                                                                                                                                             a0",
                                                                                     11
                                                                                                                                                                                                                  0";
                                                                                             0
                                                                                                              0
                                                                                                                           0
                                                                                                                                          0
                                                                                                                                                                     0
                                                                                                                                                                                   0
                                                                                                                                                                                                  0
                                                                         = " 1
                                                                                                          1
                                                                                                                          0
                                                                                                                                        0
                                                                                                                                                                   0
                                                                                                                                                                                 0
                                                                                                                                                                                                0
                                                                                                                                                                                                               0",
             write
                                                                                              х
                                                                                                                           х
                                                                                                                                          х
                                                                                                                                                                                   х
                                                                                                                                                                                                 х
                                                                                                                                                                                                             a8",
                                                                                                            х
                                                                                                                                                                     x
                                                                                      " a7 a6 a5 a4
                                                                                                                                                                   a3 a2 a1
                                                                                                                                                                                                                a0",
                                                                                                                            i
                                                                                                                                                                                                 i
                                                                                                                                                                                                                  i";
                                                                                              i
                                                                                                              i
                                                                                                                                           i
                                                                                                                                                                     i
                                                                                                                                                                                   i
             mode
                                                              = 0x04;
                                                              = 5;
             delay
             blocksize
                                                              = 128;
             readsize
                                                             = 256;
           ;
    memory "flash"
                  paged
                                                                             = yes;
                   size
                                                                            = 16384;
                  page size
                                                                           = 128;
                  num pages
                                                                           = 128;
                  min_write_delay = 14000;
                  max_write_delay = 14000;
                                                                   = 0xff;
                   readback_p1
                   readback_p2
                                                                            = 0xff;
                                                                             = " 0
                                                                                                                0 1 0
                                                                                                                                                                       0 0 0
                                                                                                                                                                                                                  0",
                   read lo
```

```
" x x x a12
" a7 a6 a5 a4
                     " x
                                               a8",
                                    all al0 a9
                                    a3 a2 a1
                                              a0",
                    " 0
                         0
                            0
                               0
                                     0 0
                                           0
                                               o";
      read hi
                   = " 0 0 1 0
                                     1 0 0 0",
                    " x x x a12
                                    all al0 a9 a8",
                    " a7 a6
                            a5 a4
                                     a3 a2 a1
                                               a0",
                      0
                          0
                             0
                                      0
                                               0";
                                              0",
                   = " 0
                               0
                                     0 0 0
      loadpage lo
                         1
                             0
                    " x x x
                                              x",
                               x
                                     х х
                    **
                      x x a5 a4
                                              a0",
                                     a3 a2 a1
                       i
                          i
                             i
                                i
                                     i
                                         i
                   = " 0 1 0
                               0
                                              0",
      loadpage hi
                                     1 0 0
                    " x x x
                                              x",
                               x
                                      х х х
                    " x x a5 a4
                                     a3 a2 a1 a0",
                    11
                         i
                             i
                               i
                                     i i i
                                               i";
                                           0 0",
                   = " 0 1
                            0 0
                                     1 1
      writepage
                                    all al0 a9 a8",
                    " x x x a12
                    " a7 a6 x x x x x x",
                    " x x x x
                                     x x x x";
               = 0x21;
     mode
     delay
               = 16;
     blocksize
               = 128;
     readsize
               = 256;
   memory "fuse"
     size
                  = 1;
      min write delay = 2000;
      max_write_delay = 2000;
                 = "0 1 0 1 0 0 0 0 xxxx xxxx",
                    "x x x x x x x x x x o x o o o o o";
                   = "1 0 1 0 1 1 0 0 1 0 1 x x x x x",
      write
                    "x x x x x x x x 1 i 1 i i i i i i;
    ;
   memory "lock"
     size
                   = 1;
      min write delay = 2000;
      max_write_delay = 2000;
                 = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
      read
                    "x x x x x x x x x x o o o o o o";
                  = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
      write
                    "xxxx xxxx 11ii iiii";
   memory "signature"
    size
                  = 3;
      read
                   = "0 0 1 1 0 0 0 0
                                         x x x x x x x x",
                    "x x x x x x a1 a0 0 0 0 0 0 0 0";
 ;
#-----
# ATmega8
part
  id
                = "m8";
   desc
               = "ATmega8";
   stk500\_devcode = 0x70;

avr910\_devcode = 0x76;
               = 0x1e 0x93 0x07;
   signature
               = 0xd7;
   pagel
```

```
= 0xc2:
bs2
chip_erase_delay = 10000;
               = "1 0 1 0 1 1 0 0
                                     0 1 0 1 0 0 1 1",
pgm_enable
                 "x x x x x x x x
                                    xxxx xxxx";
                = "1 0 1 0 1 1 0 0
                                    100х хххх",
chip_erase
                  "x x x x x x x x x x x x x x x x x";
               = 200;
timeout
               = 100;
stabdelay
cmdexedelay
                     = 25:
synchloops
                     = 32:
               = 0;
bytedelay
               = 3;
pollindex
pollvalue
              = 0x53;
predelay
               = 1;
postdelay
               = 1;
pollmethod
                     = 0;
pp_controlstack
  0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
  0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
  0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
hventerstabdelay = 100;
progmodedelay
                  = 0;
latchcycles
                  = 5;
                  = 1;
togglevtg
poweroffdelay
                  = 15;
resetdelayms
                  = 2;
resetdelayus
                  = 0:
                 = 15;
= 15;
hvleavestabdelay
resetdelay
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
memory "eeprom"
                  = 512;
   size
                 = 4;
   page size
   min write delay = 9000;
   max write delay = 9000;
   readback p1
                 = 0xff;
                  = 0xff;
   readback p2
                  = " 1 0
  read
                              1
                                  0
                                        0 0
                    " 0 0 x x
                                         x x x a8",
                     " a7 a6 a5 a4
                                         a3 a2 a1
                                                    a0",
                       0
                           0
                               0
                                  0
                                         0
                                             0
                                                0
                                                     o";
                                                    0",
                  = " 1 1
                              0
                                  0
                                         0 0 0
  write
                    " 0 0 x x
                                         х х х а8",
                     " a7 a6 a5 a4
                                         a3 a2 a1 a0",
                       i
                          i
                              i i
                                         i
               = 0x04;
  mode
  delay
              = 20;
  blocksize
               = 128;
  readsize
               = 256;
memory "flash"
                  = yes;
   paged
   size
                  = 8192;
                 = 64;
   page size
   num_pages
                  = 128;
   min write delay = 4500;
   max_write_delay = 4500;
   readback p1 = 0xff;
```

```
readback_p2
                   = 0x00:
                   = " 0 0 1 0 0 0 0 0",
" 0 0 0 0 all al0 a9 a8",
   read lo
                    " a7 a6 a5 a4
                                     a3 a2 a1 a0",
                    " 0
                          0
                              0
                                  0
                                       0 0
                                              0
                                                   o";
                   = " 0
   read hi
                           0
                               1
                                  0
                                       1
                                          0
                                              0
                                                  0",
                    " 0
                                      all al0 a9 a8",
                           0
                               0
                                  0
                     " a7 a6 a5 a4
                                      a3 a2 a1 a0",
                    " 0
                                       0 0
                                                  o";
                           0
                              0
                                  0
                                              0
                                                    0",
                   = " 0
                               0
                                   0
                                        0 0
                                                0
   loadpage_lo
                           1
                                         x x x x",
a3 a2 a1 a0",
                     " 0
                           0
                               0
                                  0
                     " x
                           x
                               х
                                  a4
                    " i
                           i
                               i
                                  i
                                         i
                                             i
                                                i
                                                    i";
                   = " 0
                                  0
                                                     0",
                                                0
                           1
                               0
                                         1
                                             0
   loadpage hi
                     " 0
                           0
                               0
                                  0
                                                    x",
                                         х
                                             х
                                                 х
                                         x x
a3 a2
                     " x
                           x
                               x a4
                                                a1 a0",
                    " i
                                                i
                                                    i";
                          i
                                  i
                                         i
                                            i
                               i
                  = " 0
   writepage
                          1
                               0 0
                                         1 1 0
                                                    0",
                    " 0 0 0 0 0 " a7 a6 a5 x " x x x x
                                        all al0 a9 a8",
                                      x x x x x
                                                     x",
                                                     x";
  mode
               = 0x21;
  delay
              = 10;
  blocksize
              = 64;
              = 256;
  readsize
memory "lfuse"
                  = 1;
   size
   min write delay = 2000;
   max_write_delay = 2000;
                 = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0",
   read
                    "x x x x x x x x o o o o o o o o";
   write
                  = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
                    "x x x x x x x x i i i i i i i i";
memory "hfuse"
                  = 1:
   size
   min write delay = 2000;
   max_write_delay = 2000;
                 = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
   read
                    "x x x x x x x x 0 0 0 0 0 0 0 0";
                  = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
"x x x x x x x x x i i i i i i i i;
   write
memory "lock"
   size
                  = 1:
   min write delay = 2000;
   max_write_delay = 2000;
                  = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
   read
                    "x x x x x x x x x x o o o o o o";
                    "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
"x x x x x x x x 1 1 i i i i i i;
                  = "1 0 1 0 1 1 0 0
   write
memory "calibration"
   size
                  = 4;
                  = "0 0 1 1
   read
                                  1 0 0 0
                                             0 0 x x x x x x",
                    "0 0 0 0
                                  0 0 a1 a0
                                             0 0 0 0 0 0 0 0";
```

```
memory "signature"
                      = 3;
       size
                      = "0 0 1 1
       read
                                     0 0 0 0
                                                x x x x x x x x x",
                       "x x x x x x a1 a0
                                                0 0 0 0 0 0 0 0";
  ;
#-----
# ATmega8515
part
   id
                   = "m8515";
   desc
                   = "ATmega8515";
   stk500_devcode
                   = 0x63;
                  = 0x3A;
   avr910_devcode
                   = 0x1e 0x93 0x06;
   signature
   chip_erase_delay = 9000;
   pgm_enable
                   = "1 0 1 0 1 1 0 0
                                       0101 0011",
                     "x x x x x x x x x x x x x x x x x x ";
                   = "1 0 1 0 1 1 0 0
                                       100x xxxx",
   chip_erase
                     = 200;
   timeout
   stabdelay
                  = 100;
                         = 25;
   cmdexedelay
   synchloops
                         = 32;
                  = 0;
   bytedelay
   pollindex
                  = 3;
   pollvalue
                  = 0x53;
                  = 1;
   predelay
   postdelay
                  = 1;
   pollmethod
                         = 0;
   pp_controlstack
       0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F, 0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
       0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
   hventerstabdelay
                    = 100;
   progmodedelay
                      = 0;
   latchcycles
                      = 6;
                     = 0;
   togglevtg
                    = 0;
   poweroffdelay
   resetdelayms
                      = 0;
   resetdelayus
                      = 0:
                    = 15;
   hvleavestabdelay
   chiperasepulsewidth = 0;
   chiperasepolltimeout = 10;
   programfusepulsewidth = 0;
   programfusepolltimeout = 5;
   programlockpulsewidth = 0;
   programlockpolltimeout = 5;
   memory "eeprom"
       size
                      = 512;
       min write delay = 9000;
       max write delay = 9000;
       readback_p1 = 0xff;
       readback_p2
                      = 0xff;
                = " 1
 read
                        0 1
                               0
                                      0
                                          0 0
                                                0",
                        " 0 0
                                                      a8",
                                 х
                                     x
                                           х х х
                        " a7
                             a6
                                 a5 a4
                                            a3 a2 a1 a0",
                           0
                               0
                                      0
                                             0
                                          0 0 0",
               = " 1 1 0 0
                                      0
 write
```

```
" 0 0 x x
" a7 a6 a5 a4
" i i i i
                                      x x x a8",
a3 a2 a1 a0",
                                          i i
                                                 i";
                                      i
             = 0x04;
  mode
  delay = 20;
blocksize = 128;
readsize = 256;
memory "flash"
  paged
                = yes;
                = 8192;
= 64;
   size
   page size
   num_pages = 128;
   min write delay = 4500;
   max write delay = 4500;
   readback_p1 = 0xff;
   readback_p2
                 = 0xff;
                          0 1
                                     0 0
                               0
                                           0
                                               0",
   read_lo
                  = " 0
                   " 0 0 0 0 all al0 a9 a8",
                   " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                   " 0
                         0
                             0
                                0
                                     0 0
                                             0
                                                o";
                  = " 0
   read hi
                          0
                             1
                                 0
                                    1 0
                                            0
                                                0",
                   " 0 0
                            0 0 all al0 a9 a8",
                   " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                   " 0 0
                                    0 0 0 0";
                            0 0
                  = " 0
                                       0 0 0 0",
   loadpage lo
                         1
                             0
                                0
                   " 0
                                0
                                      x x x x",
a3 a2 a1 a0",
                                                  x",
                          0
                             0
                   " x x
                            x a4
                   " i i
                                                 i";
                                       i
                  = " 0
                             0
                                0
                         1
                                      1
                                          0
                                             0
                                                  0",
   loadpage_hi
                                0
                                      x x x
a3 a2 a1
                   " 0
                         0
                             0
                                                  x",
                   " x
                                                 a0",
                         x
                             x a4
                   " i i
                            i
                                i
                                      i
                                         i
                                             i
                                                 i";
                                0
                 = " 0
                        1
                             0
                                       1 1
                                             0
                                                  0",
   writepage
                   " 0 0 0 0 0 " a7 a6 a5 x " x x x x
                                     all al0 a9 a8",
                                      x x x x x
                                                  x",
                                                  x";
  mode
             = 0x21;
              = 6;
  delay
            = 64;
= 256;
             = 64;
  blocksize
  readsize
memory "lfuse"
   size
                 = 1;
   min_write_delay = 4500;
   max_write_delay = 4500;
                 = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0",
                   "x x x x x x x x o o o o o o o o";
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
   write
                   "xxxx xxxx iiii iiiii";
memory "hfuse"
   size
                 = 1;
   min write delay = 4500;
   max_write_delay = 4500;
                = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
                   "x x x x x x x x o o o o o o o o";
   write
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 0",
                   "xxxx xxxx iiii iiii";
```

```
memory "lock"
      size
                   = 1;
      min_write_delay = 4500;
      max_write_delay = 4500;
                    read
                      "x x x x x x x x x x o o o o o o";
                    = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
      write
                     "xxxx xxxx 11ii iiii";
   memory "calibration"
      size
                    = 4;
                    = "0 0 1 1 1 0 0 0
      read
                                        0 0 x x x x x x",
                     memory "signature"
                    = 3;
     size
      read
                    = "0 0 1 1
                                  0 0 0 0
                                            x x x x x x x x",
                     "x x x x x x a1 a0 0 0 0 0 0 0 0";
 ;
# ATmega8535
#-----
part
                 = "m8535";
   id
                 = "ATmega8535";
   desc
   stk500 devcode = 0x64;
   avr910 devcode = 0x69;
   signature
                = 0x1e 0x93 0x08;
   pagel
                 = 0xd7;
   bs2
                 = 0xa0;
   chip erase delay = 9000;
                 = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
   pgm_enable
                   = "1 0 1 0 1 1 0 0
                                    100x xxxx",
   chip_erase
                   "x x x x x x x x
                                    xxxx xxxx";
                 = 200;
   timeout
   stabdelay
                 = 100;
   cmdexedelay
                      = 25;
   synchloops
                      = 32;
                = 0;
   bytedelay
   pollindex
                = 3;
   pollvalue
                = 0x53;
                = 1;
   predelay
   postdelay
                = 1;
   pollmethod
                      = 0;
   pp_controlstack
      0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
      0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
   hventerstabdelay = 100;
   progmodedelay
                   = 0;
   latchcycles
                   = 6;
                   = 0;
   togglevtg
   poweroffdelay
                   = 0;
                   = 0;
   resetdelayms
   resetdelayus
                  = 0;
```

```
hvleavestabdelay
                = 15;
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
memory "eeprom"
                = 512;
   size
   min write delay = 9000;
   max_write_delay = 9000;
              = 0xff;
   readback p1
                = 0xff;
   readback_p2
                = " 1 0
                                               0",
  read
                           1
                               0
                                     0 0
                  " 0 0 x x
                                     х х х а8",
                   " a7 a6 a5 a4
                                     a3 a2 a1 a0",
                     0
                            0
                               0
                                     0 0 0 0";
                        0
                = " 1 1
                           0
                               0
                                     0 0
                                            0
                                               0",
  write
                                     x x x a8",
                   " 0 0 x x
                   " a7 a6 a5 a4
                                     a3 a2 a1 a0",
                   " i i
                           i i
                                     i i i i";
             = 0x04;
  mode
  delay
             = 20;
  blocksize
             = 128;
  readsize
             = 256;
memory "flash"
                = yes;
  paged
                = 8192;
   size
   page size
                = 64;
   num_pages
                = 128;
   min_write_delay = 4500;
   max_write_delay = 4500;
   readback_pl = 0xff;
   readback_p2
                 = 0xff;
                 = " 0
                                               0",
                         0
                           1
                               0
                                    0
                                      0
                                           0
   read lo
                        0
                            0
                               0
                                  a11 a10
                                          a9
                                              a8",
                   " a7 a6
                           a5 a4
                                   a3 a2
                                          a1
                                              a0",
                   " 0
                                               o";
                        0
                            0
                               0
                                    0
                                       0
                                           0
                                              0",
                 = " 0
                         0
   read hi
                            1
                                0
                                   1 0
                                          0
                   " 0
                       0
                                  a11 a10
                           0
                               0
                                          a9
                                             a8",
                   " a7 a6
                           a5
                               a4
                                   a3 a2
                                          a1
                                             a0",
                   " 0
                                              0";
                        0
                            0
                               0
                                    0 0
                                           0
                                               0",
                 = " 0
                       1
                                     0 0 0
   loadpage_lo
                            0
                                0
                        0
                   **
                     0
                            0
                               0
                                     x x x
a3 a2 a1
                                               x",
                   11
                     x
                        x
                            x
                               a4
                                                a0",
                     i
                         i
                                i
                                      i
                                         i
                                             i
                                                i";
   loadpage hi
                 = " 0
                         1
                            0
                                0
                                     1
                                          0
                                            0
                                                 0",
                     0
                               0
                                               x",
                         0
                            0
                                     х х
                                            х
                   11
                                                a0",
                            x a4
                                     a3 a2
                                            a1
                     х х
                   11
                     i
                         i
                            i
                               i
                                      i
                                         i
                                             i
                                                i";
                                                 0",
                 = " 0 1
                            0
                              0
   writepage
                                      1 1
                   " 0 0 0 0
                                    a11 a10 a9
                                                a8",
                   " a7 a6 a5 x
                                                x",
                                    x x x x x
                        х
                            х х
                                                x";
             = 0x21;
  mode
  delay
             = 6;
  blocksize
             = 64;
  readsize
             = 256;
memory "lfuse"
```

```
= 1:
       size
       min write delay = 2000;
       max_write_delay = 2000;
                    = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
       read
                       "x x x x x x x x 0 0 0 0 0 0 0 0";
                     = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
"x x x x x x x x i i i i i i i;";
       write
   memory "hfuse"
      size
                      = 1;
       min write delay = 2000;
       max_write_delay = 2000;
                    = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
       read
                       "x x x x x x x x 0 0 0 0 0 0 0 0";
                     = "1 0 1 0 1 1 0 0 1 0 1 0 0 0",
"x x x x x x x x x iiii iiii;;
       write
   memory "lock"
                     = 1;
      size
       min write delay = 2000;
       max_write_delay = 2000;
                    = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
       read
                       "x x x x x x x x x x o o o o o o";
                       "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
"x x x x x x x x 1 1 i i i i i i;
       write
                     = "1 0 1 0 1 1 0 0
   memory "calibration"
                     = 4;
      size
                      = "0 0 1 1 1 0 0 0 0 0 x x x x x x",
       read
                       "0 0 0 0 0 0 al a0 0 0 0 0 0 0 0";
   memory "signature"
      size
                      = 3;
                      = "0 0 1 1
                                     0 0 0 0
       read
                                                x x x x x x x x",
                       "x x x x x x a1 a0 o o o o o o o";
 ATtiny26
#-----
part
   id
                     = "t26";
                    = "ATtiny26";
   desc
   stk500 devcode = 0x21;
                     = 0x5e;
   avr910 devcode
   signature
                     = 0x1e 0x91 0x09;
   pagel
                     = 0xb3;
   bs2
                     = 0xb2;
   chip erase delay
                     = 9000;
   pgm enable
                      = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
                       "x x x x x x x x x x x x x x x x ;
                     = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
   chip erase
                       "xxxx xxxx xxxx xxxx";
                  = 200;
   timeout
                  = 100;
   stabdelay
                        = 25;
   cmdexedelay
                        = 32;
   synchloops
                  = 0;
   bytedelay
```

```
pollindex
             = 3;
pollvalue
             = 0x53;
             = 1;
predelay
postdelay
             = 1;
pollmethod
                    = 0;
pp_controlstack
   0xC8, 0xE8, 0xD8, 0xF8, 0x4C, 0x6C, 0x5C, 0x7C,
   0xEC, 0xBC, 0x00, 0x06, 0x00, 0x00, 0x00, 0x00;
hventerstabdelay = 100;
progmodedelay
                 = 0;
                = 5:
latchcycles
togglevtg
                = 1;
poweroffdelay
               = 15;
                = 2;
resetdelayms
resetdelayus
                = 0;
                = 15;
hvleavestabdelay
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
memory "eeprom"
                 = 128;
   size
   min write delay = 9000;
   max write delay = 9000;
                = 0xff:
   readback_p1
   readback_p2
                 = 0xff;
                              0 0 0 0
   read
                 = "1 0 1 0
                                           xxxx xxxx",
                   "x a6 a5 a4 a3 a2 a1 a0
                                           0000 0000";
                 = "1 1 0 0 0 0 0 0
   write
                                           x x x x x x x x",
                   "x a6 a5 a4 a3 a2 a1 a0 iiii iiii;
  mode
             = 0x04;
  delay
             = 10;
             = 64;
  blocksize
             = 256;
  readsize
memory "flash"
   paged
                 = yes;
                = 2048;
   size
   page size
                = 32;
   num_pages
                = 64;
   min_write_delay = 4500;
   max_write_delay = 4500;
   readback_p1
                 = 0xff;
                 = 0xff;
   readback_p2
   read lo
                 = " 0 0 1 0 0 0 0",
                   " x x x x x x a9 a8",
                   " a7 a6 a5 a4 a3 a2 a1 a0",
                   " 0 0 0 0
                                 0 0 0 0";
                                1 0 0 0",
                 = " 0 0 1 0
   read hi
                   " x x x x x x a9 a8",
                   " a7 a6 a5 a4 a3 a2 a1 a0",
                     0 0 0 0
                                0 0 0 0";
                 = " 0 1 0 0
                                0 0 0 0",
   loadpage_lo
                   " x x x x x x x x",
                     x x x x a3 a2 a1 a0",
                   "
                     i i i i
                                i i i i";
                 = " 0 1 0 0 1 0 0 0",
   loadpage_hi
                   " x x x x
                                x x x x",
```

```
x x x x a3 a2 a1 a0",
i i i i i i i i i";
                     = " 0 1 0 0 1 1 0 0",
       writepage
                       " x x x x x x a9 a8",
                       " a7 a6 a5 a4 x x x x",
                          x x x x x x x x";
                  = 0x21;
     mode
     delay
                 = 6;
     blocksize = 16;
readsize = 256;
   memory "signature"
                     = 3;
      size
                     = "0 0 1 1 0 0 0 0 x x x x x x x x x x , ",
"0 0 0 0 0 0 al a0 0 0 0 0 0;
       read
   memory "lock"
      size
                     = 1;
                     = "0 1 0 1
                                    1 0 0 0
                                                 x x x x x x x x",
       read
                       "x x x x
                                                 x x x x x x o o";
                                    x x x x
                     = "1 0 1 0 1 1 0 0 1 1 1 1 1 ii",
       write
                       "x x x x x x x x x x x x x x x x x x ";
      min_write_delay = 9000;
      max write delay = 9000;
   memory "lfuse"
      size
                     = 1;
                     = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
       write
                       "xxxx xxxx iiii iiiii";
                     = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
      read
                       "x x x x x x x x o o o o o o o o";
      min_write_delay = 9000;
      max write delay = 9000;
   memory "hfuse"
      size
                     = 1;
                     = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
       write
                       "x x x x x x x x x x x i i i i i";
                     = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
      read
                       "x x x x x x x x x x x o o o o o";
      min_write_delay = 9000;
      max write delay = 9000;
   memory "calibration"
     size
                     = 4:
                     = "0 0 1 1 1 0 0 0 x x x x x x x x x x , ",
"0 0 0 0 0 0 al a0 0 0 0 0 0 0;
       read
                                                 0000 0000";
;
# ATtiny261
#-----
# Close to ATtiny26
                     = "t261";
   id
                    = "ATtiny261";
   desc
```

```
has_debugwire = yes;
 flash_instr = 0xB4, 0x00, 0x10;
eeprom_instr = 0xBB, 0xFF, 0xBB, 0xEE, 0xBB, 0xCC, 0xB2, 0x0D,
                 0xBC, 0x00, 0xB4, 0x00, 0xBA, 0x0D, 0xBB, 0xBC,
                 0x99, 0xE1, 0xBB, 0xAC;
                     = 0x21;
 stk500_devcode
avr910 devcode
                     = 0x5e;
signature
                     = 0x1e 0x91 0x0c;
                     = 0xb3;
pagel
bs2
                     = 0xb2;
chip erase delay
                     = 4000;
                     = "1 0 1 0 1 1 0 0
                                             0 1 0 1 0 0 1 1",
pgm enable
                        "x x x x x x x x
                                             xxxx xxxx";
                      = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
chip erase
                       "x x x x x x x x x x x x x x x x";
                 = 200;
timeout
                 = 100;
stabdelay
cmdexedelay
synchloops
                        = 32;
bytedelay
                 = 0;
                 = 3;
pollindex
                 = 0x53;
pollvalue
                 = 1;
predelay
postdelay
                 = 1;
pollmethod
                        = 0;
pp controlstack
    0xC4, 0xE4, 0xC4, 0xE4, 0xCC, 0xEC, 0xCC, 0xEC,
    0\mathtt{xD4}\,,\ 0\mathtt{xF4}\,,\ 0\mathtt{xD4}\,,\ 0\mathtt{xF4}\,,\ 0\mathtt{xDC}\,,\ 0\mathtt{xFC}\,,\ 0\mathtt{xDC}\,,\ 0\mathtt{xFC}\,,
    0xC8, 0xE8, 0xD8, 0xF8, 0x4C, 0x6C, 0x5C, 0x7C, 0xEC, 0xBC, 0x00, 0x06, 0x00, 0x00, 0x00, 0x00;
hventerstabdelay
                     = 100;
                     = 0;
progmodedelay
latchcycles
                     = 5;
togglevtg
                    = 1;
poweroffdelay
                     = 15;
resetdelayms
                     = 2;
resetdelayus
                     = 0;
hvleavestabdelay
                     = 15:
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
ocdrev
                      = 1;
memory "eeprom"
                     = no;
   paged
                     = 128;
    size
                     = 4;
    page size
    num_pages
                     = 32;
    min write delay = 4000;
    max_write_delay = 4000;
    readback p1
                    = 0xff;
    readback p2
                     = 0xff;
                     = "1 0 1 0
                                       0 0 0 0
    read
                                                      x x x x x x x x",
                        "x a6 a5 a4 a3 a2 a1 a0
                                                      0000000";
    write
                      = "1 1 0 0
                                       0 0 0 0
                                                      x x x x x x x x",
                       "x a6 a5 a4 a3 a2 a1 a0
                                                      iiii iiii";
   loadpage_lo
                     1
                           1
                               0
                                    0
                                           0
                                                0
                                                    0
                                                         1",
                                                         0",
                     0
                           0
                               0
                                    0
                                           0
                                                0
                                                    0
                                                0 a1 a0",
                   11
                      0
                           0
                               0
                                    0
                                           0
```

```
" i
                                           i";
                    i
                        i
                           i
                                 i
                                    i
                                        i
             = " 1 1
                                0 0
                                           0",
                        0
                           0
  writepage
                                       1
                                x x x x",
              " 0 0 ж ж
               " x a6 a5 a4
                                a3 a2 0 0",
               " x x x x
                                x x x x";
  mode
             = 0x41;
             = 10;
  delav
  blocksize
            = 4;
  readsize
            = 256;
memory "flash"
  paged
               = yes;
   size
               = 2048;
            = 32;
= 64;
  page size
   num pages
   min_write_delay = 4500;
   max_write_delay = 4500;
   readback_p1
               = 0xff;
   readback_p2
               = 0xff;
   read lo
                = " 0 0 1 0 0 0 0",
                  " x x x x x x a9 a8",
                  " a7 a6 a5 a4 a3 a2 a1 a0",
                  " 0 0 0 0 0 0 0 0";
   read hi
                = " 0 0 1 0
                               1 0 0 0",
                  " x x x x
                               x x a9 a8",
                  " a7 a6 a5 a4 a3 a2 a1 a0",
                  " 0 0 0 0
                              0 0 0 0";
                = " 0 1 0 0
                               0 0 0 0",
   loadpage_lo
                  " x x x x x x x x x x",
" x x x x x a3 a2 a1 a0",
                  " i i i i
                              i i i i";
                = " 0 1 0 0
                               1 0 0 0",
   loadpage_hi
                  11
                    x x x
                               x x x x",
                  " x x x x " i i i i
                              a3 a2 a1 a0",
                              i i i i";
                = " 0 1 0 0 1 1 0 0",
   writepage
                  " x x x x x x a9 a8",
" a7 a6 a5 a4 x x x x",
                  = 0x41;
  mode
  delay
            = 6;
  blocksize
            = 32;
            = 256;
  readsize
memory "signature"
                = 3;
   size
                read
                                         xxxx xxxx",
                                         0000 0000";
memory "lock"
                = 1;
   size
                = "0 1 0 1
                              1 0 0 0
                                         x x x x x x x x",
   read
                 "x x x x
                              x x x x
                                         x x x x x x o o";
                = "1 0 1 0 1 1 0 0
                                         1111 11ii",
   write
                "x x x x x x x x x x x x x x x x ;
   min write delay = 4500;
   max_write_delay = 4500;
```

```
memory "lfuse"
                   = 1;
      size
                   = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
      write
                     "x x x x x x x x i i i i i i i i";
                   = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
      read
                     "x x x x x x x x o o o o o o o o";
      min_write_delay = 4500;
      max_write_delay = 4500;
   memory "hfuse"
                   = 1;
      size
                   = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0",
      write
                     "xxxx xxxx iiii iiii";
                   = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
      read
                     "x x x x x x x x 0 0 0 0 0 0 0 0";
      min write delay = 4500;
      max_write_delay = 4500;
   memory "efuse"
      size
                   = 1;
                   = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
      write
                     "x x x x x x x x x x x x x x i";
      read
                   = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
                     "xxxx xxxx xxxx xxxo";
      min write_delay = 4500;
      max write delay = 4500;
   memory "calibration"
                   = 1;
      size
                   = "0 0 1 1 1 0 0 0 xxxx xxxx",
      read
                     ;
;
          ______
# ATtiny461
#-----
# Close to ATtiny261
part
   id
                   = "t461";
                   = "ATtiny461";
   desc
    has_debugwire = yes;
   flash instr = 0xB4, 0x00, 0x10;
   eeprom instr = 0xBB, 0xFF, 0xBB, 0xEE, 0xBB, 0xCC, 0xB2, 0x0D,
               0xBC, 0x00, 0xB4, 0x00, 0xBA, 0x0D, 0xBB, 0xBC,
               0x99, 0xE1, 0xBB, 0xAC;
                  = 0x21;
= 0x5e;
   stk500 devcode
   avr910 devcode
                   = 0x1e 0x92 0x08;
   signature
                   = 0xb3;
   pagel
                   = 0xb2;
   bs2
   chip erase delay
                   = 4000;
                   = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
   pgm_enable
                     "x x x x x x x x x x x x x x x x";
                   = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
   chip erase
                     "xxxx xxxx xxxx xxxx";
   timeout
               = 200;
```

```
= 100;
stabdelay
                        = 25;
cmdexedelay
synchloops
                        = 32;
                = 0;
bytedelay
pollindex
                 = 3;
                = 0x53;
pollvalue
predelay
                = 1;
postdelay
                 = 1;
                        = 0;
pollmethod
pp controlstack
    0xC4, 0xE4, 0xC4, 0xE4, 0xCC, 0xEC, 0xCC, 0xEC, 0xD4, 0xF4, 0xD4, 0xF4, 0xDC, 0xFC, 0xDC, 0xFC, 0xC8, 0xE8, 0xD8, 0xF8, 0x4C, 0x6C, 0x5C, 0x7C,
    0xEC, 0xBC, 0x00, 0x06, 0x00, 0x00, 0x00, 0x00;
hventerstabdelay = 100;
                    = 0;
progmodedelay
latchcycles
                    = 5;
togglevtg
                    = 1;
                   = 15;
poweroffdelay
resetdelayms
                    = 2;
resetdelayus
                   = 0;
= 15;
hvleavestabdelay
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
ocdrev
                     = 1:
memory "eeprom"
    paged
                    = no;
                     = 256;
    size
                    = 4:
    page size
    num_pages
                   = 64;
    min write delay = 4000;
    max_write_delay = 4000;
                 = 0xff;
    readback_p1
    readback_p2
                    = 0xff;
                     = " 1 0 1 0
                                     0 0 0 0
    read
                                                     xxxx xxxx",
                       "a7 a6 a5 a4 a3 a2 a1 a0
                                                      0000 0000";
                                                     x x x x x x x x x",
i i i i i i i i i";
                     = " 1 1 0 0
                                     0 0 0 0
    write
                       "a7 a6 a5 a4 a3 a2 a1 a0
                 = " 1
   loadpage_lo
                          1
                              0
                                  0
                                          0
                                              0
                                                   0
                                                       1",
                                                      0",
                                                 0
                      0
                          0
                              0
                                  0
                                          0
                                              0
                   "
                      0
                          0
                              0
                                   0
                                          0
                                              0
                                                a1
                                                      a0",
                     i
                          i
                              i
                                  i
                                          i
                                              i
                                                   i
                                                       i";
                 = " 1
                          1
                              0
                                   0
                                          0
                                              0
                                                  1
                                                       0",
  writepage
                   " 0
                         0 x
                                                      x",
                                 x
                                         х х х
                   " a7
                        a6 a5 a4
                                         a3 a2
                                                  0
                                                       0",
                                                  x
                                                      x";
                                  x
                                         x
                                              х
                = 0x41;
  mode
  delay
                 = 10;
  blocksize
                = 4;
  readsize
                = 256;
memory "flash"
   paged
                    = yes;
                    = 4096;
    size
                    = 64;
    page size
                    = 64;
    num_pages
    min_write_delay = 4500;
```

```
max_write_delay = 4500;
   readback_p1 = 0xff;
readback_p2 = 0xff;
   read lo
                  = " 0 0 1 0 0 0 0 0",
                   " x x x x x a10 a9 a8",
" a7 a6 a5 a4 a3 a2 a1 a0",
                   " 0 0 0 0
                                     0 0 0";
                                  0
                  = " 0 0 1 0 1 0 0 0",
   read hi
                   " x x x x x a10 a9 a8",
                    " a7 a6 a5 a4 a3 a2 a1 a0",
                   " 0 0 0 0 0 0 0 0";
                  = " 0 1 0 0 0 0 0 0",
   loadpage lo
                    " x x x x x x x x",
                   " x x x a4 a3 a2 a1 a0",
" i i i i i i i i;;
                                 1 0 0 0",
                  = " 0 1 0 0
   loadpage_hi
                   " x x x x x x x x",
                    " x x x a4 a3 a2 a1 a0",
                   " i i i i i i i";
                  = " 0 1 0 0 1 1 0 0",
   writepage
                   " x x x x x a10 a9 a8",
                   " a7 a6 a5 x x x x x",
                   " x x x x x x x x";
  mode
              = 0x41;
             = 6;
  delav
 blocksize
             = 64;
  readsize
             = 256;
memory "signature"
  size
                 = 3;
                 = "0 0 1 1 0 0 0 0 x x x x x x x x x x ,",
"0 0 0 0 0 0 al a0 0 0 0 0 0 0;
   read
memory "lock"
  size
                  = 1:
                  = "0 1 0 1 1 0 0 0 xxxx xxxxx",
   read
                   "x x x x x x x x x x x x x x x o o";
                  = "1 0 1 0 1 1 0 0 1 1 1 1 ii",
   write
                  "x x x x x x x x x x x x x x x x x x ";
   min_write_delay = 4500;
   max_write_delay = 4500;
memory "lfuse"
   size
                  = 1;
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
   write
                   "x x x x x x x x i i i i i i i i";
                  = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0",
   read
                   "x x x x x x x x 0 0 0 0 0 0 0 0";
   min write delay = 4500;
   max write delay = 4500;
memory "hfuse"
   size
                  = 1;
                  = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
   write
                   "x x x x x x x x i i i i i i i i;
                  = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
   read
                   "x x x x x x x x o o o o o o o o";
```

```
min write delay = 4500;
       max write delay = 4500;
    memory "efuse"
       size
                       = 1;
                       = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
        write
                         "x x x x x x x x
                                            xxxx xxxi";
                        = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
       read
                         "x x x x x x x x x x x x x x o";
       min_write_delay = 4500;
       max write delay = 4500;
    memory "calibration"
       size
                       = 1;
                       = "0 0 1 1 1 0 0 0 x x x x x x x x x x ;",
"0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0;
       read
# ATtiny861
#-----
# Close to ATtiny461
part
                       = "t861";
   id
                       = "ATtiny861";
    desc
    has debugwire = yes;
    flash_instr = 0xB4, 0x00, 0x10;
     eeprom_instr = 0xBB, 0xFF, 0xBB, 0xEE, 0xBB, 0xCC, 0xB2, 0x0D,
                   0xBC, 0x00, 0xB4, 0x00, 0xBA, 0x0D, 0xBB, 0xBC,
                   0x99, 0xE1, 0xBB, 0xAC;
                       = 0x21;
= 0x5e;
   stk500_devcode
#
    avr910_devcode
    signature
                       = 0x1e 0x93 0x0d;
    pagel
                       = 0xb3;
                       = 0xb2;
    bs2
                       = 4000;
    chip erase delay
                       = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
    pgm enable
                         "x x x x x x x x x x x x x x x x";
                        = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
    chip_erase
                         "x x x x x x x x x x x x x x x x";
    timeout
                    = 200;
    stabdelay
                    = 100;
    cmdexedelay
    synchloops
                   = 0;
    bytedelay
    pollindex
                   = 3;
    pollvalue
                   = 0x53;
                   = 1;
    predelay
    postdelay
                    = 1;
    pollmethod
                          = 0;
    pp_controlstack
        0xC4, 0xE4, 0xC4, 0xE4, 0xCC, 0xEC, 0xCC, 0xEC,
        0xD4, 0xF4, 0xD4, 0xF4, 0xDC, 0xFC, 0xDC, 0xFC,
        {\tt 0xC8}\,,\ {\tt 0xE8}\,,\ {\tt 0xD8}\,,\ {\tt 0xF8}\,,\ {\tt 0x4C}\,,\ {\tt 0x6C}\,,\ {\tt 0x5C}\,,\ {\tt 0x7C}\,,
        0xEC, 0xBC, 0x00, 0x06, 0x00, 0x00, 0x00, 0x00;
    hventerstabdelay = 100;
    progmodedelay
                       = 0;
    latchcycles
                       = 5;
    togglevtg
                       = 1;
```

```
= 15;
poweroffdelay
resetdelayms
resetdelayus
                  = 2;
                 = 0:
hvleavestabdelay = 15;
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
ocdrev
                  = 1;
memory "eeprom"
   paged
                = no;
   size
                = 512;
                = 128;
   num_pages
   page size
                 = 4;
   min_write_delay = 4000;
   max_write_delay = 4000;
   readback_p1
                = 0xff;
   readback_p2
                = 0xff;
   read
                  = " 1 0 1 0 0 0 0 0
                                              хххх ххха8",
                    "a7 a6 a5 a4 a3 a2 a1 a0
                                              0000 000 0";
                  = " 1 1 0 0 0 0 0 0
   write
                                              хххх ххха8",
                   "a7 a6 a5 a4 a3 a2 a1 a0
                                              iiii iii i";
              = " 1
  loadpage lo
                       1
                          0
                              0
                                    0
                                        0
                                            0
                                              1",
                                              0",
                " 0
                      0
                                          0
                          0
                              0
                                    0
                                        0
                " 0
                          0
                              0
                                    0
                                        0 a1 a0",
                     0
                " i
                     i
                          i
                              i
                                    i i
                                           i i";
              = " 1
                      1
                          0
                              0
                                    0
                                        0
                                            1
                                              0",
  writepage
                " 0
                     0 x
                             x
                                       x
                                           ж а8",
                                    x
                                   a3 a2 0 0",
                " a7 a6 a5 a4
                " x
                     х х х
                                    x x x x";
  mode
              = 0x41;
  delay
              = 10;
  blocksize
              = 4;
  readsize
             = 256;
memory "flash"
   paged
                  = yes;
                 = 8192;
   size
                = 64;
= 128;
   page_size
   num_pages
   min_write_delay = 4500;
   max_write_delay = 4500;
                = 0xff;
   readback_p1
   readback p2
                 = 0xff;
                  = " 0 0 1 0 0 0 0 0",
" x x x x all al0 a9 a8",
   read lo
                    " a7 a6 a5 a4 a3 a2 a1 a0",
                    " 0 0 0 0
                                  0
                                     0 0 0";
                  = " 0 0 1 0
                                 1
                                      0 0 0",
   read hi
                      x x x x all al0 a9 a8",
                    " a7 a6 a5 a4 a3 a2 a1 a0",
                      0 0 0 0
                                      0 0 0";
                                  0
                  = " 0 1 0 0
                                 0 0 0 0",
   loadpage_lo
                    11
                      x x x x x x x x",
                      x x x a4 a3 a2 a1 a0",
i i i i i i i i;;
```

```
= "
                        1 0 0
                      0
                                 1 0 0 0",
   loadpage_hi
                   " x x x x x x x x x",
" x x x a4 a3 a2 a1 a0",
" i i i i i i i i;;
                 = \ " \quad 0 \quad 1 \quad 0 \quad 0 \quad 1 \quad 1 \quad 0 \quad 0" \, ,
   writepage
                   " x x x x all alo a9 a8",
" a7 a6 a5 x x x x x",
" x x x x x x x x x";
  mode
             = 0x41;
  delay
             = 6;
           = 0
= 256;
  blocksize
  readsize
memory "signature"
                 = 3;
   size
                 = "0 0 1 1 0 0 0 0
   read
                                            xxxx xxxx",
                  "0 0 0 0 0 0 al a0 0000 000";
memory "lock"
                 = 1;
                 = "0 1 0 1 1 0 0 0
   read
                                            x x x x x x x x x ",
                   "x x x x
                                            x x x x x x o o";
                              = "1 0 1 0 1 1 0 0 1 1 1 1 1 ii",
   write
                   min write delay = 4500;
   max write delay = 4500;
memory "lfuse"
   size
                 = 1;
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
   write
                   "x x x x x x x x i i i i i i i i;
                 = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0,
   read
                   "x x x x x x x x 0 0 0 0 0 0 0 0";
   min write delay = 4500;
  max_write_delay = 4500;
memory "hfuse"
   size
                 = 1;
                 = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
   write
                   "x x x x x x x x i i i i i i i i";
   read
                 "x x x x x x x x o o o o o o o o";
  min write delay = 4500;
  max write delay = 4500;
memory "efuse"
   size
                 = 1;
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
   write
                   "x x x x x x x x x x x x x x i";
                 = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
   read
                   "x x x x x x x x x x x x x x x o";
  min write delay = 4500;
  max_write_delay = 4500;
memory "calibration"
   size
                 = 1;
                 = "0 0 1 1 1 0 0 0 xxxx xxxx",
   read
```

```
# ATmega48
            -----
part
   id
                   = "m48";
                   = "ATmega48";
   desc
    has_debugwire = yes;
    flash instr = 0xB6, 0x01, 0x11;
    eeprom_instr = 0xBD, 0xF2, 0xBD, 0xE1, 0xBB, 0xCF, 0xB4, 0x00,
                  0xBE, 0x01, 0xB6, 0x01, 0xBC, 0x00, 0xBB, 0xBF,
                  0x99, 0xF9, 0xBB, 0xAF;
   stk500 devcode
                   = 0x59;
    avr910_devcode
                   = 0x;
                   = 0x1e 0x92 0x05;
   signature
   pagel
                   = 0xd7;
   bs2
                   = 0xc2;
   chip_erase_delay = 45000;
                   = "1 0 1 0 1 1 0 0
                                         0101 0011",
   pgm enable
                                         x x x x x x x x x ";
                     "x x x x x x x x
                   = "1 0 1 0 1 1 0 0
                                        100x xxxx",
   chip erase
                     timeout
                   = 200;
                   = 100;
   stabdelay
   cmdexedelay
                         = 25;
   synchloops
                         = 32;
                  = 0;
   bytedelay
                  = 3;
   pollindex
                  = 0x53;
   pollvalue
   predelay
                  = 1;
   postdelay
                  = 1;
   pollmethod
                         = 1:
   pp_controlstack
      0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
      {\tt 0x4E,\ 0x5E,\ 0x4F,\ 0x5F,\ 0x6E,\ 0x7E,\ 0x6F,\ 0x7F,}
      0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
      0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
   hventerstabdelay = 100;
progmodedelay = 0;
   progmodedelay
   latchcycles
                     = 5;
   togglevtg
                     = 1;
                      = 15;
   poweroffdelay
   resetdelayms
                      = 1;
   resetdelayus
                      = 0;
   hvleavestabdelay
                     = 15;
                      = 15;
   resetdelay
   chiperasepulsewidth = 0;
   chiperasepolltimeout = 10;
   programfusepulsewidth = 0;
   programfusepolltimeout = 5;
   programlockpulsewidth = 0;
   programlockpolltimeout = 5;
   ocdrev
                      = 1;
   memory "eeprom"
       paged
                      = no;
       page_size
                      = 4;
                      = 256;
       size
       min write delay = 3600;
       max_write_delay = 3600;
       readback p1 = 0xff;
```

```
= 0xff;
   readback_p2
               = " 1 0
                          1
                              0
                                    0 0
                                          0
                                              0",
  read
                  " 0 0 0 x
                                              x",
                                    х х х
                  " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                  " 0
                                    0 0 0 0";
                       0
                          0 0
               = " 1
                              0
                                    0 0
                                              0",
  write
                      1
                          0
                                          0
                  " 0
                       0
                          0
                              x
                                       x
                                          x
                                              x",
                  " a7 a6
                                    a3 a2 a1 a0",
                          a5 a4
                  " i
                                           i i";
                        i
                           i
                                    i
                                        i
             = " 1
                        0
                           0
                                     0
                                        0
                                           1",
  loadpage_lo
                    1
                                 0
               11
                     0
                        0
                            0
                                 0
                                     0
                                       0
                                           0",
                    0
                0
                                       al a0",
                        0
                                 0
                                     0
                           0
               " i
                    i
                        i
                           i
                                 i
                                    i
                                        i
                                          i";
             = " 1
                   1
                        0
                           0
                                 0
                                    0
                                          0",
                                        1
  writepage
                                           x",
                    0
                       х
                                 ж ж
a3 a2
                           х
                                        x
               " a7 a6 a5 a4
                                        0
                                            0",
               " x
                                    x x x";
                    х
                       x
                          x
                                 х
  mode
             = 0x41;
  delay
             = 20;
  blocksize
            = 4;
  readsize = 256;
memory "flash"
  paged
               = yes;
   size
                = 4096;
            = 64;
= 64;
   page size
                = 64;
   num pages
   min write delay = 4500;
   max write delay = 4500;
   readback_p1 = 0x00;
   readback_p2
                = 0x00;
                = " 0
   read lo
                        0 1
                             0
                                   0 0 0 0",
                                  0 a10 a9 a8",
                  " 0 0 0 0
                  " a7 a6 a5 a4
                                  a3 a2 a1 a0",
                  " 0 0
                                             0";
                           O
                               0
                                   0 0
                                         0
                = " 0
                                             0",
                                   1 0
   read hi
                        0
                           1
                               0
                                         0
                  " 0
                                   0 a10 a9 a8",
                        0
                           0
                               0
                  " a7 a6
                          a5 a4
                                  a3 a2 a1 a0",
                                            o";
                     0
                        0
                           0
                               0
                                   0 0
                                          0
   loadpage lo
                = " 0
                            0
                               0
                                     0
                                        0
                                            0
                                               0",
                  " 0
                                          х х",
                        0
                           0
                              х
                                    х х
                  " x x
                                              a0",
                              a4
                                    a3 a2 a1
                           x
                  **
                                              i";
                    i
                      i
                           i
                              i
                                    i
                                       i
                                          i
   loadpage_hi
                = " 0
                        1
                           0
                               0
                                     1
                                        0
                                            0
                                               0",
                  " 0
                                          x
                                               x",
                        0
                           0
                              x
                                     x
                                        x
                  " х х
                                    a3 a2 a1
                                              a0",
                           x a4
                  " i
                                               i";
                = " 0
                        1
                           0
                               0
                                     1 1
                                           0
                                               0",
   writepage
                  " 0
                          0
                       0
                              0
                                     0 a10
                                           a9
                                              a8",
                  " а7 а6 а5 х
                                              x",
                                     x x x
                  " x
                          х х
                                       х х
                                               x";
                       x
                                    х
             = 0x41;
  mode
             = 6;
  delay
            = 64;
  blocksize
  readsize
            = 256;
memory "lfuse"
   size
  min_write_delay = 4500;
  max write delay = 4500;
```

```
= "0 1 0 1 0 0 0 0
                                  00000000",
      read
                   "xxxx xxxx oooo oooo";
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
      write
                  "xxxx xxxx iiii iiii";
   memory "hfuse"
     size
                 = 1;
     min write delay = 4500;
     max write delay = 4500;
                 = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
     read
                   "x x x x x x x x 0 0 0 0 0 0 0 0";
     write
                = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
                  "xxxx xxxx iiii iiii";
   memory "efuse"
                 = 1:
     size
     min write delay = 4500;
     max_write_delay = 4500;
                 = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
     read
                   "x x x x x x x x x x x x x x o";
     write
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
                  "x x x x x x x x x x x x x x i";
   memory "lock"
                 = 1:
     size
     min write delay = 4500;
     max write delay = 4500;
                 = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
     read
                   "x x x x x x x x x x x o o o o o o";
                = "1 0 1 0 1 1 0 0 1 1 1 x x x x x x",
     write
                   "xxxx xxxx 11ii iiii";
   memory "calibration"
    size
                 = 1:
                  = "0 0 1 1 1 0 0 0
                                      0 0 0 x x x x x",
     read
                  memory "signature"
                = 3;
    size
                 = "0 0 1 1 0 0 0 0 0 0 0 x x x x x x",
     read
                            x x a1 a0 0 0 0 0 0 0 0";
                   "x x x x
# ATmega48P
#-----
part parent "m48"
              = "m48p";
  id
              = "ATmega48P";
= 0x1e 0x92 0x0a;
   desc
  signature
                 = 1;
   ocdrev
# ATmega88
#-----
part
```

```
= "m88";
id
                  = "ATmega88";
desc
 has debugwire = yes;
 flash_instr = 0xB6, 0x01, 0x11;
 eeprom instr = 0xBD, 0xF2, 0xBD, 0xE1, 0xBB, 0xCF, 0xB4, 0x00,
                 {\tt 0xBE}\,,\ {\tt 0x01}\,,\ {\tt 0xB6}\,,\ {\tt 0x01}\,,\ {\tt 0xBC}\,,\ {\tt 0x00}\,,\ {\tt 0xBB}\,,\ {\tt 0xBF}\,,
                 0x99, 0xF9, 0xBB, 0xAF;
stk500 devcode
                  = 0x73;
avr910_devcode = 0x;
                  = 0x1e 0x93 0x0a;
signature
pagel
                  = 0xd7;
                  = 0xc2;
bs2
chip erase delay = 9000;
                  = "1 0 1 0 1 1 0 0
                                           0 1 0 1 0 0 1 1",
pgm enable
                    "x x x x x x x x
                                          x x x x x x x x x ";
                                          100x xxxx",
                  = "1 0 1 0 1 1 0 0
chip erase
                    "x x x x x x x x
                                          xxxx xxxx";
                 = 200;
timeout
                 = 100;
stabdelay
cmdexedelay
                        = 25;
synchloops
                        = 32;
                 = 0;
bytedelay
pollindex
                 = 3;
pollvalue
                 = 0x53;
predelay
                 = 1;
postdelay
                 = 1;
pollmethod
                        = 1;
pp_controlstack
   0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
   0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
                     = 100;
hventerstabdelay
progmodedelay
                     = 0;
latchcycles
                     = 5;
                     = 1;
togglevtg
poweroffdelay
                     = 15;
resetdelayms
                     = 1;
                     = 0:
resetdelayus
hvleavestabdelay
                   = 15;
resetdelay
                     = 15;
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
ocdrev
                     = 1;
memory "eeprom"
   paged
                     = no;
    page_size
                     = 4:
                     = 512;
    size
    min write delay = 3600;
    max_write_delay = 3600;
    readback p1
                   = 0xff;
                     = 0xff;
    readback_p2
                                                           0",
                    = " 1
                                      0
                                              0
                                                       0
   read
                                  1
                        " 0
                                  0
                                                       ж а8",
                              0
                                      x
                                               x
                                                  x
                        " a7 a6 a5 a4
                                              a3 a2 a1 a0",
                                                             o";
                    = " 1
                                  0
                                       0
                                              0
                                                  0
                                                       0
                                                           0",
   write
                             1
                       " 0
                              0
                                  0
                                       x
                                               x
                                                  x
                                                           a8",
                                                       х
                        " a7
                                                           a0",
                                              a3 a2
                              a6
                                  a5 a4
                                                       a1
                        " i
                                                             i";
                               i
                                   i
                                        i
                                               i
                                                   i
                                                        i
```

```
0
  loadpage_lo = " 1
                   1
                       0
                          0
                                   0
                                      0
                                         1",
                                  0 0 0",
              " 0
                  0
                       0
                          0
              " 0
                  0
                       0
                          0
                              0 0 a1 a0",
              " i
                  i i
                              i i i i";
            = " 1
                       0
                          0
                               0
                                  0
                                        0",
  writepage
                   1
                                     1
                  0
                              x x x a8",
a3 a2 0 0",
                      x
                         x
              " a7 a6 a5 a4
              " x x x x
                              x x x x";
            = 0x41;
  mode
            = 20;
  delay
            = 4;
 blocksize
           = 256;
 readsize
memory "flash"
  paged
               = yes;
               = 8192;
   size
              = 64;
   page_size
  num_pages
              = 128;
   min_write_delay = 4500;
   max_write_delay = 4500;
             = 0xff;
   readback p1
               = 0xff;
   readback_p2
               = " 0
   read lo
                       0 1
                            0 0 0 0 0",
                 " 0 0 0 0 all al0 a9 a8",
                 " a7 a6 a5 a4
                               a3 a2 a1 a0",
                 11
                   0
                         0
                            0
                                 0 0
                                       0
                      0
                                         0",
               = " 0 0
   read hi
                          1
                            0
                                1 0
                                      0
                 " 0 0
                        0 0 all al0 a9 a8",
                 " a7 a6 a5 a4 a3 a2 a1 a0",
                                 0 0 0 0";
                   0 0
                         0
                            0
               = " 0 1
                                 0 0 0 0",
   loadpage_lo
                          0
                            0
                 " 0 0
                          0 x
                                  x x x x",
                 " x x x a4
                                  a3 a2 a1 a0",
                 " i i
                                        i
                                           i";
                         i
                            i
                                  i
                                    i
                = " 0
                                      0
   loadpage_hi
                       1
                          0
                            0
                                  1
                                        0
                                            0",
                                           x",
                 " 0 0
                          0 x
                                  х х х
                 " x x x a4
                                 a3 a2 a1 a0",
                 " i i
                          i
                            i
                                  i i i
                                           i";
               = " 0
                       1
                          0
                            0
                                  1 1
                                            0",
   writepage
                 " 0 0 0 0
                                 all al0 a9 a8",
                                 x x x x",
x x x x";
                 " a7 a6 a5 x
                 " x x x x
  mode
            = 0x41;
  delay
            = 6;
          = 64;
 blocksize
  readsize
           = 256;
memory "lfuse"
              = 1:
  size
  min write delay = 4500;
   max write delay = 4500;
               = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
   read
                 "x x x x x x x x 0 0 0 0 0 0 0 0";
               = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
   write
                "xxxx xxxx iiii iiiii";
memory "hfuse"
               = 1:
  size
   min write delay = 4500;
```

```
max_write_delay = 4500;
             = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
"x x x x x x x x x 0 0 0 0 0 0;
      write
                   = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
                    "xxxx xxxx iiii iiiii";
    ;
   memory "efuse"
                  = 1;
     size
     min write delay = 4500;
     max_write_delay = 4500;
                  = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
                    "x x x x x x x x x x x x o o o";
      write
                   = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
                    "x x x x x x x x x x x x i i i";
   memory "lock"
                  = 1;
     size
     min_write_delay = 4500;
     max_write_delay = 4500;
                = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
      read
                    "x x x x x x x x x x o o o o o o";
      write
                  = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
                    "x x x x x x x x 1 1 i i i i i i i;
   memory "calibration"
                  = 1;
     size
                   read
   memory "signature"
     size
                  = 3;
                   = "0 0 1 1 0 0 0 0 0 0 x x x x x x'',
      read
                    "x x x x
                               x x a1 a0
                                         0 0 0 0 0 0 0 0";
          _____
# ATmega88P
#-----
part parent "m88"
   id
                = "m88p";
   desc
                = "ATmega88P";
               = 0x1e 0x93 0x0f;
   signature
                  = 1;
   ocdrev
#-----
   id
               = "m168";
               = "ATmega168";
   desc
   has debugwire = yes;
   flash_instr = 0xB6, 0x01, 0x11;
   eeprom instr = 0xBD, 0xF2, 0xBD, 0xE1, 0xBB, 0xCF, 0xB4, 0x00,
               0xBE, 0x01, 0xB6, 0x01, 0xBC, 0x00, 0xBB, 0xBF, 0x99, 0xF9, 0xBB, 0xAF;
   stk500_devcode = 0x86;
   \# avr910 devcode = 0x;
   signature = 0x1e 0x94 0x06;
```

```
= 0xd7:
pagel
                 = 0xc2;
bs2
chip_erase_delay = 9000;
pgm_enable
                = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
                    "x x x x x x x x x x x x x x x ";
                  = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
chip erase
                    "x x x x x x x x x x x x x x x x ";
                 = 200;
timeout
stabdelay
                 = 100;
                 = 25;
cmdexedelay
                 = 32;
synchloops
                 = 0;
bytedelay
pollindex
                = 3;
pollvalue
                 = 0x53;
                 = 1;
predelay
postdelay
                 = 1;
pollmethod
                 = 1;
pp_controlstack
   0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
  0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
hventerstabdelay = 100;
progmodedelay
                     = 0;
                     = 5;
latchcycles
togglevtg
                     = 1;
poweroffdelay
                     = 15;
                     = 1;
resetdelayms
                     = 0;
resetdelayus
hvleavestabdelay
                     = 15;
resetdelay
                     = 15;
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
ocdrev
                     = 1:
memory "eeprom"
   paged
                     = no:
                     = 4;
    page size
                     = 512;
    size
    min write delay = 3600;
    max_write_delay = 3600;
                     = 0xff;
    readback_p1
    readback_p2
                     = 0xff;
    read
                     = " 1 0 1 0 0 0 0 0",
                       " 0 0 0 x x x x a8",
                        " a7 a6 a5 a4 a3 a2 a1 a0",
                        " 0 0 0 0 0 0 0 0";
    write
                     = " 1 1 0 0 0 0 0 0",
                        " 0 0 0 x x x x a8",
                        " a7 a6 a5 a4 a3 a2 a1 a0",
                        " i i i i i i i";
                 = "
                           1
                                    0
                                                0
                                                    0
                                                        1",
   loadpage lo
                     1
                               0
                   " 0
                                                        0",
                                                0 0
                           0
                               0
                                   0
                                           0
                   " 0
                          0
                               0
                                   0
                                           0
                                                0 a1 a0",
                   11
                           i
                               i
                                    i
                                                        i";
                 = "
                                   0
                      1
                           1
                               0
                                           0
                                                0
                                                    1
                                                        0",
   writepage
                   11
                     0
                           0
                               x
                                           x
                                               x
                                                       a8",
                                   x
                   " a7
                                                        0",
                         a6 a5
                                  a4
                                          a3
                                              a2
                                                    0
                   " x
                                                        x";
                          х
                               х
                                   х
                                           х
                                               х
                                                    х
```

```
= 0x41;
  mode
              = 20;
  delay
              = 4;
  blocksize
  readsize = 256;
memory "flash"
   paged
                  = yes;
                  = 16384;
   size
   page size
                 = 128;
                  = 128;
   num_pages
   min write delay = 4500;
   max_write_delay = 4500;
   readback_p1 = 0xff;
   readback_p2
                  = 0xff;
                   = " 0 0 1 0 0 0 0 0",
   read lo
                     " 0 0 0 a12 a11 a10 a9 a8",
                     " a7 a6 a5 a4 a3 a2 a1 a0",
                     " 0 0 0 0 0 0 0 0";
   read_hi
                    = " 0 0 1 0 1 0 0 0",
                      " 0 0 0 a12 a11 a10 a9 a8",
                      " a7 a6 a5 a4 a3 a2 a1 a0",
                      " 0 0 0 0 0 0 0 0 0";
   loadpage lo
                   = " 0 1 0 0 0 0 0 0",
                     " 0 0 0 x x x x x",
                     " x x a5 a4 a3 a2 a1 a0",
                     " i i i i i i i";
                   = " 0 1 0 0 1 0 0 0",
   loadpage hi
                     " 0 0 0 x x x x x",
                     " x x a5 a4 a3 a2 a1 a0",
                     " i i i i i i i";
                   = " 0 1 0 0 1 1 0 0",
   writepage
                     " 0 0 0 a12 a11 a10 a9 a8",
                     " a7 a6 x x x x x x",
                     " x x x x x x x x";
               = 0x41;
   mode
              = 6;
   delay
   blocksize = 128;
   readsize
               = 256;
memory "lfuse"
   size
                   = 1;
   min_write_delay = 4500;
   max_write_delay = 4500;
                   = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0,
   read
                     "x x x x x x x x o o o o o o o o";
   write
                   = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
                     "x x x x x x x x i i i i i i i i";
memory "hfuse"
                   = 1;
   size
   min write delay = 4500;
   max_write_delay = 4500;
   read
                   = "0 1 0 1 1 0 0 0 0 0 0 1 0 0 0",
                     "x x x x x x x x o o o o o o o o";
                   = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
   write
                     "x x x x x x x x i i i i i i i i;
```

```
memory "efuse"
                  = 1;
      size
      min write delay = 4500;
      max_write_delay = 4500;
                   = "0 1 0 1 0 0 0 0 0 0 0 1 0 0 0",
                    "x x x x x x x x x x x x x o o o";
      write
                   = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
                    "x x x x x x x x x x x x i i i";
   memory "lock"
      size
                   = 1;
      min write delay = 4500;
      max_write_delay = 4500;
                   = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0",
                    "x x x x x x x x x x x o o o o o o";
                   = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
      write
                    "x x x x x x x x 1 1 i i i i i i";
   memory "calibration"
                   = 1;
                   = "0 0 1 1 1 0 0 0 0 0 0 x x x x x",
      read
                    memory "signature"
      size
                   = 3;
                   = "0 0 1 1 0 0 0 0 0 0 0 x x x x x",
      read
                    "x x x x x x a1 a0 o o o o o o o o";
            _____
# ATmega168P
#------
part parent "m168"
  id
               = "m168p";
               = "ATmega168P";
   desc
               = 0x1e 0x94 0x0b;
   signature
   ocdrev
                  = 1;
;
            -----
# ATtiny88
#-----
part
  id
                = "t88";
                = "ATtiny88";
   has_debugwire = yes;
   flash_instr = 0xB6, 0x01, 0x11;
    eeprom_instr = 0xBD, 0xF2, 0xBD, 0xE1, 0xBB, 0xCF, 0xB4, 0x00,
               0xBE, 0x01, 0xB6, 0x01, 0xBC, 0x00, 0xBB, 0xBF,
               0x99, 0xF9, 0xBB, 0xAF;
  stk500 devcode = 0x73;
#
   avr910_devcode = 0x;
   signature
                = 0x1e 0x93 0x11;
   pagel
                = 0xd7;
   bs2
                = 0xc2;
   chip erase delay = 9000;
               = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
   pgm_enable
                  "x x x x x x x x x x x x x x x x";
                = "1 0 1 0 1 1 0 0
   chip_erase
                                  100x xxxx",
```

```
= 200;
timeout
              = 100;
stabdelay
cmdexedelay
                    = 25;
                    = 32;
synchloops
              = 0;
bytedelay
pollindex
              = 3;
pollvalue
              = 0x53;
              = 1;
predelay
postdelay
              = 1;
pollmethod
                    = 1;
pp_controlstack
  0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
  0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
  0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
hventerstabdelay = 100;
                 = 0;
progmodedelay
                = 5;
latchcycles
togglevtg
                = 1;
poweroffdelay
                = 15;
resetdelayms
resetdelayus
                 = 1;
                 = 0;
hvleavestabdelay
                 = 15;
resetdelay
                = 15;
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
ocdrev
                  = 1;
memory "eeprom"
   paged
                 = no;
                = 4;
   page size
                 = 64;
   size
   min write delay = 3600;
   max write delay = 3600;
                = 0xff;
   readback_p1
                  = 0xff;
   readback_p2
                 = " 1
                                                 0",
                                0
  read
                        0
                            1
                                       0 0
                                              0
                                       x x x x",
a3 a2 a1 a0",
                    " 0
                            0 x
                         0
                    11
                      ж аб
                             a5 a4
                                                  0";
                      0
                         0
                             0
                                 0
                                       0
                                           0
                                              0
                                          0
  write
                 = " 1
                       1
                             0
                                0
                                       0
                                              0
                                                 0",
                    " 0
                         0
                             0
                                       x x x x",
                                х
                    11
                      х а6
                             a5
                                a4
                                       a3
                                          a2
                                              a1
                                                 a0",
                      i
                          i
                                        i
                                            i
                                                  i";
              = " 1
                      1
                          0
                              0
                                    0
                                        0
                                            0
                                               1",
  loadpage lo
                      0
                                         0
                                              0",
                   0
                          0
                              0
                                    0
                                        0
                "
                   0
                      0
                          0
                              0
                                    0
                                        0 a1 a0",
                11
                   i
                      i
                          i
                              i
                                    i
                                        i
                                           i
                                               i";
              = " 1
                          0
                              0
                                    0
                                       0
                                               0",
                     1
  writepage
                " 0
                     0 x x
                                    х х х
                                               x",
                                               0",
                "
                  x a6 a5 a4
                                   a3 a2 0
                11
                   x
                      х
                         x
                             х
                                    x
                                       х
                                         x
                                               x";
              = 0x41;
  mode
  delay
              = 20;
              = 4;
  blocksize
  readsize
              = 64;
memory "flash"
   paged
                  = yes;
```

```
= 8192:
   size
   page_size = 64;
num_pages = 128;
   min_write_delay = 4500;
   max_write_delay = 4500;
   readback_p1 = 0xff;
   readback_p2
                 = 0xff;
   read_lo
                 = " 0
                         0
                             1
                                0
                                     0 0
                                           0
                                               0",
                   " 0 0 0 all al0 a9 a8",
                   " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                   " 0
                         0
                            0
                                     0 0
                                            0
                                                0";
                 = " 0
   read hi
                         0
                                0
                                     1 0
                                           0
                                               0",
                             1
                   " 0
                            0
                               0 all al0 a9 a8",
                        0
                   " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                   " 0 0
                                     0 0 0 0";
                            0 0
                 = " 0
                         1
                             0
                                0
                                      0 0
                                             0 0",
   loadpage lo
                   " 0
                                          х х
                                                 x",
                         0
                             0
                                x
                                      x
                                     a3 a2 a1 a0",
                   " x x
                            x a4
                   " i i
                                i
                                      i
                                         i
                                                 i";
                 = " 0
                        1
                             0
                                0
                                          0
                                             0
                                                 0",
   loadpage_hi
                                      1
                   " 0
                                      x x x x",
a3 a2 a1 a0",
                                                 x",
                         0
                             0
                                x
                   " x
                         х
                             x a4
                   " i
                            i
                        i
                                i
                                      i
                                         i
                                             i
                                                 i";
                 = " 0
                        1
                               0
                                                0",
                             0
                                             0
                                      1 1
   writepage
                   " 0 0 0 0 0 " a7 a6 a5 x " x x x x
                                     all al0 a9 a8",
                                     x x x x x",
x x x x x";
  mode
             = 0x41;
             = 6;
  delay
           = 0...
= 256;
  blocksize
  readsize
memory "lfuse"
   size
                 = 1;
   min write delay = 4500;
   max_write_delay = 4500;
                 = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0",
   read
                   "x x x x x x x x 0 0 0 0 0 0 0 0";
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
   write
                   "x x x x x x x x i i i i i i i i;
memory "hfuse"
   size
                 = 1;
   min_write_delay = 4500;
   max_write_delay = 4500;
                 = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
                   "x x x x x x x x o o o o o o o o";
                 = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
   write
                  "xxxx xxxx iiii iiiii";
memory "efuse"
   size
                 = 1;
   min write delay = 4500;
   max_write_delay = 4500;
   read
                = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
                   "x x x x x x x x x x x x x o o o";
   write
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
                   "xxxx xxxx xxxx xxxi";
```

```
memory "lock"
      size
      min_write_delay = 4500;
      max_write_delay = 4500;
                    "x x x x x x x x x x x o o o o o o";
                    = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
       write
                      "xxxx xxxx 11ii iiii";
   memory "calibration"
      size
                    = 1;
      read
                    = "0 0 1 1 1 0 0 0
                                             0 0 0 x x x x x",
                     "0 0 0 0
                                   0 0 0 0
   memory "signature"
                    = 3;
     size
      read
                    = "0 0 1 1
                                  0 0 0 0
                                             0 0 0 x x x x x",
                     "x x x x x x a1 a0 o o o o o o o";
 ;
#-----
#-----
part
                 = "m328";
  id
                 = "ATmega328";
   desc
   0x99, 0xF9, 0xBB, 0xAF;
   stk500 devcode = 0x86;
   \# avr910_devcode = 0x;
   signature = 0x1e 0x95 0x14;
pagel = 0xd7;
                      = 0xc2;
   bs2
                      = 9000;
   chip erase delay
   pgm enable = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
            "x x x x x x x x x x x x x x x x ";
   chip erase = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
            "x x x x x x x x x x x x x x x x ";
   timeout = 200;
   stabdelay = 100;
   cmdexedelay
                = 25;
                = 32;
   synchloops
   bytedelay = 0;
   pollindex = 3;
   pollvalue = 0x53;
   predelay = 1;
   postdelay = 1;
   pollmethod
                = 1;
   pp_controlstack =
     0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F, 0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
     0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
     {\tt 0xBE}\,,\ {\tt 0xFD}\,,\ {\tt 0x00}\,,\ {\tt 0x01}\,,\ {\tt 0x00}\,,\ {\tt 0x00}\,,\ {\tt 0x00}\,,\ {\tt 0x00}\,,
                      = 100;
   hventerstabdelay
   progmodedelay = 0;
   latchcycles
                       = 5;
                = 1;
   togglevtg
   poweroffdelay = 15;
```

```
= 1;
resetdelayms
resetdelayus
                      = 15;
hvleavestabdelay
resetdelay
                      = 15;
chiperasepulsewidth
                    = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
ocdrev
                   = 1;
memory "eeprom"
  paged = no;
              = 4;
  page size
               = 1024;
  size
  min_write_delay = 3600;
  max_write_delay = 3600;
  readback_p1 = 0xff;
  readback_p2 = 0xff;
  read = " 1 0 1 0 0 0 0 0",
         " 0 0 0 x x x a9 a8",
         " a7 a6 a5 a4 a3 a2 a1 a0",
         " 0 0 0 0 0 0 0 0 0";
  write = " 1 1 0 0 0 0 0 0",
         " 0 0 0 x x x a9 a8",
         " a7 a6 a5 a4 a3 a2 a1 a0",
         " i i i i i i i";
  loadpage_lo = " 1 1 0 0 0 0 0 1",
               " 0 0 0 0 0 0 0 0",
               " 0 0 0 0 0 0 a1 a0",
               " i i i i i i i";
  writepage = " 1 1 0 0 0 0 1 0",
             " 0 0 x x x x a9 a8",
             " a7 a6 a5 a4 a3 a2 0 0",
             " x x x x x x x x";
               = 0x41;
  mode
              = 20;
  delay
             = 4;
  blocksize
  readsize
               = 256;
memory "flash"
  paged
               = yes;
  size
               = 32768;
  page_size
               = 128;
              = 256;
  num_pages
  min_write_delay = 4500;
  max write delay = 4500;
  readback_p1 = 0xff;
  readback_p2 = 0xff;
  read lo = " 0 0 1 0 0 0 0",
           " 0 0 a13 a12 a11 a10 a9 a8",
           " a7 a6 a5 a4 a3 a2 a1 a0",
           " 0 0 0 0 0 0 0 0";
  read hi = " 0 0 1 0 1 0 0 0",
           " 0 0 a13 a12 a11 a10 a9 a8",
           " a7 a6 a5 a4 a3 a2 a1 a0",
           " 0 0 0 0 0 0 0 0";
  loadpage_lo = " 0 1 0 0 0 0 0 0",
               " 0 \ 0 \ 0 \ x \ x \ x \ x",
               " x x a5 a4 a3 a2 a1 a0",
               " i i i i i i i";
```

```
loadpage hi = " 0 1 0 0 1 0 0 0",
               " 0 0 0 x x x x x",
               " x x a5 a4 a3 a2 a1 a0",
               " i i i i i i i";
  writepage = " 0 1 0 0 1 1 0 0",
             " 0 0 a13 a12 a11 a10 a9 a8",
             " a7 a6 x x x x x x",
             " x x x x x x x x";
               = 0x41;
  mode
               = 6;
  delay
               = 128;
  blocksize
  readsize
              = 256;
memory "lfuse"
  size = 1;
  min write delay = 4500;
  max_write_delay = 4500;
  read = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0",
         "x x x x x x x x o o o o o o o o";
  write = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0",
         "x x x x x x x x i i i i i i i";
memory "hfuse"
  size = 1;
  min write delay = 4500;
  max write delay = 4500;
  read = "0 1 0 1 1 0 0 0 0 0 0 1 0 0 0",
         "x x x x x x x x o o o o o o o o";
  write = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
         "x x x x x x x x i i i i i i i";
memory "efuse"
  size = 1;
  min write delay = 4500;
  max_write_delay = 4500;
  read = "0 1 0 1 0 0 0 0 0 0 0 1 0 0 0",
         "x x x x x x x x x x x x x o o o";
  write = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
        "x x x x x x x x x x x x i i i";
;
memory "lock"
  size = 1;
  min write delay = 4500;
  max_write_delay = 4500;
  read = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
         "x x x x x x x x x x o o o o o o";
  write = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
         "x x x x x x x x 1 1 i i i i i i";
memory "calibration"
  size = 1;
  read = "0 0 1 1 1 0 0 0 0 0 0 x x x x x",
         memory "signature"
  size = 3;
```

```
read = "0 0 1 1 0 0 0 0 0 0 0 x x x x x",
              "x x x x x x a1 a0 o o o o o o o o";
part parent "m328"
   id
                    = "m328p";
                    = "ATmega328P";
                   = 0x1e 0x95 0x0F;
    signature
    ocdrev
                       = 1;
;
# ATtiny2313
#-----
part
     id
                  = "t2313";
     desc
                  = "ATtiny2313";
     has debugwire = yes;
     flash_instr = 0xB2, 0x0F, 0x1F;
     eeprom_instr = 0xBB, 0xFE, 0xBB, 0xEE, 0xBB, 0xCC, 0xB2, 0x0D,
                    \texttt{0xBA}, \texttt{0x0F}, \texttt{0xB2}, \texttt{0x0F}, \texttt{0xBA}, \texttt{0x0D}, \texttt{0xBB}, \texttt{0xBC},
                    0x99, 0xE1, 0xBB, 0xAC;
    stk500 devcode = 0x23;
## Use the ATtiny26 devcode:
     avr910_devcode = 0x5e;
     signature
                      = 0x1e 0x91 0x0a;
     pagel
                      = 0xD4;
                     = 0 \times D6;
     bs2
     reset
                      = io;
     chip erase delay = 9000;
                                           0 1 0 1 0 0 1 1",
xxxx x x x x x;
                      = "1 0 1 0 1 1 0 0
     pgm enable
                        "x x x x x x x x
     chip_erase
                      = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
                        "x x x x x x x x x x x x x x x x x ;
                    = 200;
    timeout
    stabdelay
                    = 100;
                           = 25;
    cmdexedelay
    synchloops
                           = 32;
    bytedelay
                    = 0;
                    = 3;
    pollindex
                    = 0x53;
    pollvalue
    predelay
                    = 1;
    postdelay
                    = 1;
    pollmethod
                          = 1:
    pp_controlstack
        0x0E, 0x1E, 0x0E, 0x1E, 0x2E, 0x3E, 0x2E, 0x3E,
        0x4E, 0x5E, 0x4E, 0x5E, 0x6E, 0x7E, 0x6E, 0x7E,
        0x26, 0x36, 0x66, 0x76, 0x2A, 0x3A, 0x6A, 0x7A,
        0x2E, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
    hventerstabdelay = 100;
progmodedelay = 0;
    progmodedelay
                      = 5;
    latchcycles
    togglevtg
                      = 1;
                      = 15;
    poweroffdelay
    resetdelayms
resetdelayus
                        = 1;
                        = 0;
                      = 15;
    hvleavestabdelay
    chiperasepulsewidth = 0;
    chiperasepolltimeout = 10;
    programfusepulsewidth = 0;
    programfusepolltimeout = 5;
    programlockpulsewidth = 0;
    programlockpolltimeout = 5;
```

```
= 0;
   ocdrev
   memory "eeprom"
                   = 128;
      size
     paged
                   = no;
     page_size
                   = 4;
      min write delay = 4000;
      max_write_delay = 4500;
                 = 0xff;
      readback_p1
      readback p2
                   = 0xff;
                    = "1 0 1 0 0 0 0 0
                                            0 0 0 x x x x x",
       read
                      "x a6 a5 a4 a3 a2 a1 a0
                                            00000000";
                    = "1 1 0 0 0 0 0 0
       write
                                            0 0 0 x x x x x",
                      "x a6 a5 a4 a3 a2 a1 a0
                                            iiii iiii";
     loadpage_lo
               = " 1
                       1
                           0
                              0
                                    0
                                       0
                                          0
                                              1",
                 " 0
                      0
                                         0
                                             0",
                           0
                              0
                                    0
                                       0
                  " 0
                      0
                           0
                                      0 a1 a0",
                              0
                                   0
                 " i
                           i
                              i
                                          i
                                             i";
                      1 0
0 x
                = " 1
                              0
                                   0
                                      0
                                              0",
     writepage
                                          1
                 " 0
                                   x x x
a3 a2 0
                                             x",
                             x
                  " x a6 a5 a4
                                             0",
                 " x
                             x
                                   x x x x";
                      х
                          х
                = 0x41;
     mode
     delay
                = 6;
     blocksize
               = 4;
               = 256;
     readsize
    memory "flash"
      paged
                    = yes;
                    = 2048;
       size
       page size
                   = 32;
      num_pages
                   = 64;
       min write delay = 4500;
       max_write_delay = 4500;
                 = 0xff;
       readback_p1
       readback_p2
                    = 0xff;
                    = " 0
                          0 1 0 0 0 0 0",
       read lo
                     " 0 0 0 0 0 a9 a8",
                      " a7 a6 a5 a4 a3 a2 a1 a0",
                      " 0 0 0 0
                                    0 0 0 0";
                    = " 0 0 1 0
                                     1 0 0 0",
       read hi
                      " 0 0 0 0 0 a9 a8",
                      " a7 a6 a5 a4
                                     a3 a2 a1 a0",
                      " 0
                                               0";
                           0
                              0
                                 0
                                      0
                                        0 0
# The information in the data sheet of April/2004 is wrong, this works:
                   = " 0 1 0 0 0 0 0 0",
       loadpage_lo
                      " 0
                          0 0 x
                                     х х
                                           х
                      " x x x x a3 a2 a1 a0",
" i i i i i i i i;
# The information in the data sheet of April/2004 is wrong, this works:
                    = " 0 1 0 0 1 0 0",
       loadpage hi
                      " 0
                            0 0 x x x x x",
                      " x
" i
                                     a3 a2 a1 a0",
                          х х х
                              i
                                  i
                                      i
                                         i
                                               i";
# The information in the data sheet of April/2004 is wrong, this works:
       writepage
                    = " 0 1 0 0 1 1 0 0",
                      " 0 0 0 0 0 0 a9 a8",
                      " a7 a6 a5 a4
                                  x x x x",
                      " x x x x
                                  x x x x";
     mode
                = 0x41;
```

```
= 6:
      delav
                  = 32;
      blocksize
                 = 256;
      readsize
   ATtiny2313 has Signature Bytes: 0x1E 0x91 0x0A.
    memory "signature"
        size
                       = "0 0 1 1
                                     0 0 0 0
        read
                                                  0 0 0 x
                                                             x x x x",
                        "x x x x x x a1 a0 o o o o o o o";
    memory "lock"
        size
                       = 1;
                       = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
                        "x x x x x x x x 1 1 i i i i i i;
                      = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
                       "x x x x x x x x x x o o o o o o";
       min write delay = 9000;
       max write delay = 9000;
    memory "lfuse"
       size
                       = 1;
                       = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
"x x x x x x x x x i i i i i i i;;
        write
                       = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
       read
                        "x x x x x x x x 0 0 0 0 0 0 0 0";
       min write delay = 9000;
       max write delay = 9000;
    memory "hfuse"
       size
                       = 1;
                       = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
"x x x x x x x x x i i i i i i i;;
        write
                       = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
       read
                        "x x x x x x x x o o o o o o o o";
       min_write_delay = 9000;
       max write delay = 9000;
    memory "efuse"
       size
                       = 1;
                       = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
        write
                         "xxxx xxxx xxxx xxxi";
                       = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
       read
                        "x x x x x x x x 0 0 0 0 0 0 0 0";
       min_write_delay = 9000;
       max write delay = 9000;
# The Tiny2313 has calibration data for both 4 MHz and 8 MHz.
# The information in the data sheet of April/2004 is wrong, this works:
    memory "calibration"
                       = 2;
                       = "0 0 1 1
                                                  0 0 0 x x x x x",
                                    1 0 0 0
        read
                        "0 0 0 0 0 0 0 a0 0000 000";
# ATtiny4313
#-----
part
    id
                 = "t4313";
                = "ATtiny4313";
    desc
    has_debugwire = yes;
```

```
= 0xB2, 0x0F, 0x1F;
 flash instr
 eeprom instr = 0xBB, 0xFE, 0xBB, 0xEE, 0xBB, 0xCC, 0xB2, 0x0D,
               0xBA, 0x0F, 0xB2, 0x0F, 0xBA, 0x0D, 0xBB, 0xBC,
               0x99, 0xE1, 0xBB, 0xAC;
 stk500 devcode = 0x23;
Use the ATtiny26 devcode:
 avr910_devcode = 0x5e;
 signature
                 = 0x1e 0x92 0x0d;
                = 0xD4:
 pagel
bs2
                = 0xD6;
 reset
                = io;
 chip_erase_delay = 9000;
                 = "1 0 1 0 1 1 0 0
                                     0101 0011",
pgm enable
                   "x x x x x x x x
                                     xxxx xxxx";
                 = "1 0 1 0 1 1 0 0
                                     100x xxxx",
 chip erase
                   = 200;
timeout
               = 100;
stabdelay
cmdexedelay
                     = 25;
synchloops
                     = 32:
               = 0;
bytedelay
pollindex
               = 3;
pollvalue
               = 0x53;
predelay
               = 1;
postdelay
               = 1;
pollmethod
                     = 1;
pp_controlstack
   0x0E, 0x1E, 0x0E, 0x1E, 0x2E, 0x3E, 0x2E, 0x3E,
   0x4E, 0x5E, 0x4E, 0x5E, 0x6E, 0x7E, 0x6E, 0x7E,
   0x26, 0x36, 0x66, 0x76, 0x2A, 0x3A, 0x6A, 0x7A, 0x2E, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
hventerstabdelay = 100;
progmodedelay
                  = 0;
latchcycles
                  = 5;
                 = 1;
togglevtg
poweroffdelay
                  = 15;
resetdelayms
                  = 1;
                  = 0;
resetdelayus
                 = 15;
hvleavestabdelay
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
ocdrev
                   = 0;
 memory "eeprom"
                   = 256;
   size
   paged
                  = no;
   page_size
                  = 4:
    min write delay = 4000;
    max_write_delay = 4500;
                  = 0xff;
    readback p1
    readback p2
                    = 0xff;
                    = "1 0 1 0 0 0 0 0 0 0 0 x x x x x x",
    read
                     "a7 a6 a5 a4 a3 a2 a1 a0
                                                0000 0000";
                    = "1 1 0 0
                                   0 0 0 0
                                                0 0 0 x x x x x",
    write
                     "a7 a6 a5 a4 a3 a2 a1 a0
                                               iiii iiii";
                   1
                       1
                           0
                               0
                                      0
                                          0
                                              0
                                                 1",
  loadpage lo
                                          0
                 11
                   0
                       0
                           0
                               0
                                      0
                                             0
                                                 0",
                 "
                                                 a0",
                   0
                        0
                           0
                               0
                                      0
                                          0 a1
                 11
                    i
                       i
                           i
                               i
                                      i
                                          i
                                             i
                                                 i";
```

```
= " 1 1
                        0
                           0
                                 0
                                    0
                                        1
                                           0",
  writepage
              " 0
                   0 x
                          x
                                   х
                                           x",
                                 x
                                        x
                                a3 a2 0
               " a7 a6 a5 a4
                                           0",
              " x
                   х х х
                                           x";
                                х х х
  mode
             = 0x41;
  delay
             = 6;
 blocksize
            = 4;
           = 256;
 readsize
memory "flash"
   paged
                 = yes;
                = 4096;
   size
                = 64;
   page size
                = 64;
   num pages
   min_write_delay = 4500;
   max_write_delay = 4500;
               = 0xff;
    readback_p1
                 = 0xff;
    readback_p2
                 = " 0 0 1 0 0 0 0 0,
" 0 0 0 0 0 a10 a9 a8",
    read lo
                   " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                        0
                            0
                               0
                                    0
                                       0
                                            0",
                 = " 0
    read hi
                       0
                           1
                               0
                                   1 0
                                         0
                   " 0 0 0 0
                                   0 a10 a9 a8",
                   " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                   11
                     0
                         0
                           0
                               0
                                   0
                                      0
                                         0 0";
                                   0 0 0 0",
                 = " 0
                        1
                           0
                              0
    loadpage_lo
                   " 0 0 0 x
                                   x x x x",
                   " х х х а4
                                   a3 a2 a1 a0",
                   " i
                        i
                           i
                              i
                                   i i i i";
                 = " 0
                            0
                               0
                                   1 0 0 0",
    loadpage_hi
                         1
                                   x x x x",
                   " 0 0 0 x
                   " x x x a4
                                   a3 a2 a1 a0",
                     i
                                       i
                                         i
                                             i";
                        i
                            i
                               i
                                    i
                 = " 0 1 0 0
                               1 1 0 0",
    writepage
                   " 0 0 0 0 0 a10 a9 a8",
                   " a7 a6 a5 x x x x x",
                   " x x x x x x x x x";
  mode
             = 0x41;
            = 6;
  delay
            = 32;
  blocksize
  readsize
            = 256;
ATtiny4313 has Signature Bytes: 0x1E 0x92 0x0D.
memory "signature"
   size
                 = "0 0 1 1 0 0 0 0
                                          0 0 0 x x x x x",
   read
                  "x x x x x x a1 a0
                                          0 0 0 0 0 0 0 0";
memory "lock"
                 = 1:
   size
                = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
   write
                  "x x x x x x x x x 1 1 i i i i i i;
                = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0",
   read
                  "x x x x x x x x x x o o o o o o";
   min write delay = 9000;
  max_write_delay = 9000;
memory "lfuse"
   size
                 = 1;
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
    write
                  "x x x x x x x x i i i i i i i i";
```

```
read
      min write delay = 9000;
      max write delay = 9000;
    memory "hfuse"
                      = 1;
       size
                      = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0",
       write
                       "x x x x x x x x i i i i i i i i;
                      = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
       read
                       "x x x x x x x x 0 0 0 0 0 0 0 0";
      min write delay = 9000;
      max write delay = 9000;
    memory "efuse"
                      = 1;
       size
       write
                     = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
                       "x x x x x x x x x x x x x x i";
                      = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
                       "x x x x x x x x 0 0 0 0 0 0 0 0";
      min write delay = 9000;
      max write delay = 9000;
    memory "calibration"
                    = 2;
      size
                      = "0 0 1 1 1 0 0 0 0 0 0 x x x x x x",
       read
                       "0 0 0 0 0 0 a0 0000 000";
    ;
 ;
# AT90PWM2
part
                = "pwm2";
    id
                = "AT90PWM2";
    desc
    has debugwire = yes;
    flash_instr = 0xB6, 0x01, 0x11;
    eeprom_instr = 0xBD, 0xF2, 0xBD, 0xE1, 0xBB, 0xCF, 0xB4, 0x00,
                0xBE, 0x01, 0xB6, 0x01, 0xBC, 0x00, 0xBB, 0xBF,
                 0x99, 0xF9, 0xBB, 0xAF;
    stk500_devcode = 0x65;
## avr910 devcode = ?;
    signature
                  = 0x1e 0x93 0x81;
    pagel
                  = 0xD8;
                  = 0xE2;
    bs2
                   = io;
    chip_erase_delay = 9000;
                     = "1 0 1 0 1 1 0 0
    pgm enable
    chip erase
                   = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
                    "x x x x x x x x x x x x x x x x x ;
                 = 200;
   timeout
   stabdelay
                 = 100;
   cmdexedelay
                       = 25;
                       = 32;
   synchloops
   bytedelay
                 = 0;
   pollindex
                 = 3;
                 = 0x53;
   pollvalue
   predelay
                = 1;
```

```
postdelay
pollmethod
                       = 1;
pp_controlstack
    0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
    0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
    0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
                  = 100;
hventerstabdelay
                   = 0;
progmodedelay
latchcycles
                   = 5;
togglevtg
                   = 1;
poweroffdelay
                   = 15;
                   = 1;
resetdelayms
resetdelayus
                   = 0;
hvleavestabdelay
                  = 15;
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
 memory "eeprom"
    size
                     = 512;
    paged
                   = no;
   page size
                   = 4;
    min_write_delay = 4000;
     max_write_delay = 4500;
     readback p1
                     = 0xff;
                     = 0xff;
     readback_p2
                     = "1 0 1 0
                                     0 0 0 0
                                                  0 0 0 x x x x a8",
     read
                       "a7 a6 a5 a4 a3 a2 a1 a0 oooo ooo";
                     = "1 1 0 0
                                     0 0 0 0
                                                  0 0 0 x x x x a8",
     write
                       "a7 a6 a5 a4 a3 a2 a1 a0 iiii iiii";
                = "
  loadpage_lo
                     1
                         1
                             0
                                 0
                                        0
                                            0
                                                0
                                                    1",
                                                   0",
                     0
                         0
                             0
                                 0
                                        0
                                            0
                                              0
                  "
                     0
                         0
                             0
                                 0
                                        0
                                            0
                                               a1
                                                   a0",
                     i
                         i
                             i
                                 i
                                        i
                                            i
                                                i
                                                    i";
                = " 1
                             0
                                 0
                                        0
                                            0
                                                    0",
  writepage
                  " 0
                        0 x
                               х
                                        х
                                           х х
                                                    x",
                  " a7
                                                    0",
                       a6 a5
                                a4
                                       a3
                                           a2
                                               0
                                                    x";
                             x
                                 х
                                        x
                                            x
                                                x
                = 0x41;
  mode
  delay
                = 6;
  blocksize
                = 4:
  readsize
               = 256;
 memory "flash"
    paged
                     = yes;
                     = 8192;
     size
                     = 64;
     page_size
                     = 128;
     num pages
     min write delay = 4500;
     max_write_delay = 4500;
     readback p1
                   = 0xff;
                     = 0xff;
     readback_p2
                     = " 0
                                  1
                                      0
                                           0
                                               0
                                                   0
                                                       0",
     read lo
                       " 0
                                0
                                          a11 a10 a9
                             0
                                     0
                                                      a8",
                       " a7 a6 a5 a4
                                          a3 a2 a1
                                                      a0",
                       **
                     = "
     read hi
                         0
                              0
                                  1
                                      0
                                           1
                                               0
                                                  0
                                                       0",
                       " 0
                              0
                                 0
                                     0
                                          all al0 a9
                                                      a8",
                       " a7
                                                      a0",
                             a6 a5 a4
                                          a3 a2 a1
                       11
                                                       0";
                         0
                              0
                                 0
                                      0
                                           0
                                               0
                                                  0
```

```
= " 0
                              0
                                  0
                                      0
                                          0
                                             0
                                                 0",
    loadpage lo
                           1
                     " 0
                           0 0
                                                x",
                                 x
                                      x
                                         x
                                             x
                    " x
                                      a3 a2 a1 a0",
                         х х а4
                     " i
                         i i i
                                         i i i";
                   = " 0
    loadpage hi
                          1
                              0
                                  0
                                      1
                                          0
                                             0
                                                 0",
                    " 0
                             0
                                                 x",
                           0
                                 x
                                      x
                                             x
                                         x
                                      a3 a2 a1 a0",
                     " х х х а4
                    " i
                                      i
                                         i
                                             i i";
                                  1 1
                   = " 0 1 0 0
                                         0
                                              0",
    writepage
                    " 0 0 0 0 all al0 a9 a8",
" a7 a6 a5 x x x x x",
                     " x x x x
                                  x x x x";
              = 0x41;
  mode
  delay
              = 6;
             = 64;
  blocksize
             = 256;
  readsize
AT90PWM2 has Signature Bytes: 0x1E 0x93 0x81.
memory "signature"
    size
                   = "0 0 1 1 0 0 0 0 0 0 x x x x x x x",
    read
                    "x x x x x x a1 a0 oooo
                                                        0 0 0 0";
 memory "lock"
    size
                   = 1;
                   = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
    write
                    "x x x x x x x x x 1 1 i i i i i i";
   read
                  = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
                    "x x x x x x x x x x o o o o o o";
   min write delay = 9000;
   max write delay = 9000;
 memory "lfuse"
    size
                   = 1;
                   = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
    write
                    "x x x x x x x x i i i i i i i i;
                  = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
   read
                    "x x x x x x x x o o o o o o o o";
   min write delay = 9000;
   max write delay = 9000;
 memory "hfuse"
    size
                   = 1;
                   = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
    write
                    "x x x x x x x x i i i i i i i i";
                   = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
   read
                    "x x x x x x x x 0 0 0 0 0 0 0 0";
   min write delay = 9000;
   max write delay = 9000;
 memory "efuse"
    size
                   = 1;
                   = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
    write
                    "x x x x x x x x i i i i i i i i";
                  = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
    read
                    "x x x x x x x x 0 0 0 0 0 0 0 0";
   min write delay = 9000;
   max_write_delay = 9000;
```

```
memory "calibration"
                  = 1;
      size
                  = "0 0 1 1
                                      0 0 0 x x x x x",
      read
                             1 0 0 0
                   ;
          -----
# AT90PWM3
#-----
# Completely identical to AT90PWM2 (including the signature!)
part parent "pwm2"
   id
              = "pwm3";
             = "AT90PWM3";
   desc
# AT90PWM2B
#-----
# Same as AT90PWM2 but different signature.
part parent "pwm2"
   id = "pwm2b";
desc = "AT90PWM2B";
signature = 0x1e 0x93 0x83;
   ocdrev
                 = 1;
# AT90PWM3B
# Completely identical to AT90PWM2B (including the signature!)
part parent "pwm2b"
   id
             = "pwm3b";
             = "AT90PWM3B";
   desc
                 = 1;
  ocdrev
#-----
# AT90PWM316
 .....
# Similar to AT90PWM3B, but with 16 kiB flash, 512 B EEPROM, and 1024 B SRAM.
part parent "pwm3b"
   id = "pwm316";
            = "AT90PWM316";
   signature = 0x1e 0x94 0x83;
   ocdrev
  memory "flash"
     paged
                 = yes;
                 = 16384;
     size
              = 128;
= 128;
     page size
      num pages
     min_write_delay = 4500;
     max_write_delay = 4500;
     readback_p1 = 0xff;
     readback_p2
                 = 0xff;
                        0 1 0
      read_lo
                 = " 0
                                  0 0 0
                                           0",
                  " 0 0 a13 a12
                                 all al0 a9 a8",
                  " a7 a6 a5 a4
                                           a0",
                                 a3 a2 a1
```

```
0";
                          0
                              0
                                 0
                                     0
                                            0
                                               0
                      = " 0
                                           1 0
                                                      0",
                              0 1
       read hi
                                     0
                                                  0
                       " 0
                            0 a13 a12
                                          all al0 a9 a8",
                       " a7 a6 a5 a4
                                          a3 a2 a1
                          0
                              0
                                 0
                                     0
                                           0 0
                                                      o";
                      = " 0
       loadpage_lo
                              1
                                 0
                                     0
                                           0
                                               0
                                                       0",
                        " 0
                                x
                                           x
                                                  x
                                                      х",
                              0
                                    х
                                               x
                       " x x a5 a4
                                           a3 a2 a1 a0",
                          i
                            i
                                i
                                    i
                                           i i
                                                  i
                                                      i";
                                                       0",
                     = " 0
                              1
                                 0
                                    0
                                           1
                                               0
                                                   0
       loadpage hi
                        " 0
                                x
                                           x
                                                      x",
                              0
                                    x
                                               x
                                                  x
                       " x x a5 a4
                                           a3 a2 a1
                                                     a0",
                       " i
                                i
                                    i
                                           i i i
                     = " 0
                             1
                                0
                                     0
                                           1
                                               1
                                                  0
                                                      0",
       writepage
                       " 0 0 a13 a12
                                          all al0 a9 a8",
                       " a7 a6 x x
                                         x x x x",
                       " X
                            х х х
                                          x x x x";
                  = 0x21;
      mode
                  = 6;
      delay
                  = 128;
     blocksize
     readsize
                 = 256;
# ATtiny25
part
                 = "t25";
    id
               = "ATtiny25";
    desc
    has debugwire = yes;
    flash_instr = 0xB4, 0x02, 0x12;
    eeprom_instr = 0xBB, 0xFF, 0xBB, 0xEE, 0xBB, 0xCC, 0xB2, 0x0D,
                 0xBC, 0x02, 0xB4, 0x02, 0xBA, 0x0D, 0xBB, 0xBC, 0x99, 0xE1, 0xBB, 0xAC;
## no STK500 devcode in XML file, use the ATtiny45 one
   stk500_devcode = 0x14;
avr910_devcode = ?;
## Try the AT90S2313 devcode:
    avr910 devcode = 0x20;
                    = 0x1e 0x91 0x08;
    signature
    reset
                   = io;
    chip_erase_delay = 4500;
                                         0 1 0 1 0 0 1 1",
    pgm_enable
                   = "1 0 1 0 1 1 0 0
                     "x x x x x x x x
                                        x x x x x x x x";
                    = "1 0 1 0 1 1 0 0
                                       100x xxxx",
    chip erase
                     timeout
                  = 200;
   stabdelay
                  = 100;
   cmdexedelay
                        = 25;
   synchloops
                        = 32;
                  = 0;
   bytedelay
   pollindex
                  = 3;
                  = 0x53;
   pollvalue
                  = 1;
   predelay
   postdelay
                  = 1;
   pollmethod
                       = 1;
   hvsp controlstack
       0x4C, 0x0C, 0x1C, 0x2C, 0x3C, 0x64, 0x74, 0x66,
       0x68, 0x78, 0x68, 0x68, 0x7A, 0x6A, 0x68, 0x78,
```

```
0x78, 0x7D, 0x6D, 0x0C, 0x80, 0x40, 0x20, 0x10, 0x11, 0x08, 0x04, 0x02, 0x03, 0x08, 0x04, 0x00;
hventerstabdelay = 100;
hvspcmdexedelay = 0;
hvspcmdexedelay
synchcycles
                 = 6;
                  = 1;
latchcycles
                 = 1;
togglevtg
poweroffdelay
                  = 25;
resetdelayms
                  = 1;
resetdelayus
                 = 0;
hvleavestabdelay = 100;
resetdelay
                 = 25;
chiperasepolltimeout = 40;
chiperasetime = 0;
programfusepolltimeout = 25;
programlockpolltimeout = 25;
ocdrev
                  = 1;
memory "eeprom"
    size
                  = 128;
   paged
                  = no;
   page_size
                 = 4;
    min write delay = 4000;
    max_write_delay = 4500;
                = 0xff;
    readback_p1
    readback_p2
                  = 0xff;
                   = "1 0 1 0 0 0 0 0
                                              0 0 0 x x x x x",
    read
                     "x a6 a5 a4 a3 a2 a1 a0
                                              0000 0000";
                                              0 0 0 x x x x x",
                   = "1 1 0 0
                                 0 0 0 0
    write
                    "x a6 a5 a4 a3 a2 a1 a0
                                              iiii iiii";
                                         0
              = " 1
                       1
                           0
                               0
                                     0
                                            0
                                                1",
  loadpage_lo
                                                0",
                11
                   0
                       0
                           0
                               0
                                     0
                                         0
                                            0
                  0
                                         0 a1
                                               a0",
                       0
                           0
                               0
                                     0
                " i
                      i
                           i
                              i
                                     i
                                        i
                                            i
                                               i";
                      1
               = " 1
                           0
                               0
                                     0
                                        0
                                                0",
  writepage
                                            1
                11
                   0
                      0
                          x
                              x
                                     x
                                        x
                                            x
                                                x",
                                    a3 a2
                 " x a6 a5 a4
                                             0
                                                0",
                 " x
                                    x x x x";
                       x
                          х
                             х
  mode
              = 0x41;
  delay
              = 6;
  blocksize
              = 4;
             = 256;
  readsize
 memory "flash"
   paged
                   = yes;
    size
                   = 2048;
    page_size
                   = 32;
                  = 64;
    num_pages
    min write delay = 4500;
    max_write_delay = 4500;
    readback_p1
                   = 0xff;
    readback p2
                   = 0xff;
                                                  0",
                   = " 0
    read_lo
                            0 1 0
                                      0
                                          0 0
                     " 0 0 0 0
                                        0 0 a9 a8",
                     " a7 a6 a5 a4
                                       a3 a2 a1
                                                  a0",
                     " 0
                                                   o";
                            0
                               0
                                   0
                                        0
                                            0
                                              0
                   = " 0
                                                   0",
                            0
                                   0
                                            0
                                               0
    read hi
                               1
                                        1
                     " 0
                                                 a8",
                          0
                              0
                                   0
                                        0
                                           0 a9
                     " a7
                           a6 a5 a4
                                       a3 a2 a1
                                                 a0",
                                                   o";
                        0
                            0
                               0
                                   0
                                        0
                                            0
                                               0
    loadpage_lo
                   = " 0
                            1
                               0
                                   0
                                        0
                                           0
                                               0
                                                   0",
                     " 0
                            0 0
                                                  x",
                                              x
                                   х
                                        х
                                           х
                                                  a0",
                     11
                        х
                               x
                                       a3
                                          a2 a1
                            х
                                   х
```

```
i
                           i
                               i
                                   i
                                       i
                                           i
                                              i
                   = " 0
                                                  0",
                                         0
    loadpage hi
                           1
                               0
                                   0
                                       1
                                              0
                                         x x x",
                     " 0
                           0 0
                                  х
                                      х
                     " x
                                      a3 a2 a1 a0",
                          x
                              x
                                  x
                       i
                           i
                               i
                                           i
                                             i
                                                 i";
                                       i
    writepage
                   = " 0 1 0 0
                                   1 1 0 0",
                     " 0 0 0 0 0 0 a9 a8",
                     " a7 a6 a5 a4 x x x x",
                     " x x x x x x x x";
              = 0x41;
  mode
              = 6;
  delay
  blocksize
             = 32;
  readsize
             = 256;
ATtiny25 has Signature Bytes: 0x1E 0x91 0x08.
memory "signature"
   size
   read
                   = "0 0 1 1 0 0 0 0 0 0 0 x x x x x",
                    "x x x x x x a1 a0
                                             0 0 0 0 0 0 0 0";
memory "lock"
   size
                   = 1;
                   = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
    write
                    "x x x x x x x x 1 1 i i i i i i;
   min_write_delay = 9000;
   max write delay = 9000;
memory "lfuse"
   size
                   = 1;
                   = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
"x x x x x x x x x i i i i i i i i;
    write
                   = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
   read
                    "x x x x x x x x o o o o o o o o";
   min_write_delay = 9000;
   max write delay = 9000;
memory "hfuse"
   size
                   = 1;
                   = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
"x x x x x x x x x i i i i i i i i;;
    write
                   = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
   read
                    "x x x x x x x x o o o o o o o o";
   min_write_delay = 9000;
   max write delay = 9000;
 memory "efuse"
   size
                   = 1;
                   write
                    "x x x x x x x x x x x x x x i";
                   = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
   read
                    "x x x x x x x x 0 0 0 0 0 0 0 0";
   min write delay = 9000;
   max write delay = 9000;
 memory "calibration"
   size
                  = 2;
                   = "0
                        0 1 1
                                 1 0 0 0
                                              0 0 0 x x x x x",
    read
                    "0 0 0 0 0 0 a0 0000 000";
```

```
# ATtiny45
part
    id
                 = "t45";
                 = "ATtiny45";
    has_debugwire = yes;
    flash_instr = 0xB4, 0x02, 0x12;
    eeprom_instr = 0xBB, 0xFF, 0xBB, 0xEE, 0xBB, 0xCC, 0xB2, 0x0D,
                 0xBC, 0x02, 0xB4, 0x02, 0xBA, 0x0D, 0xBB, 0xBC, 0x99, 0xE1, 0xBB, 0xAC;
    stk500 devcode = 0x14;
## avr910 \overline{\text{devcode}} = ?;
## Try the AT90S2313 devcode:
    avr910 devcode = 0x20;
    signature
                   = 0x1e 0x92 0x06;
    reset
                   = io;
    chip_erase_delay = 4500;
    pgm enable
                   = "1 0 1 0 1 1 0 0
                                       0101 0011",
                      "x x x x x x x x
                                       xxxx xxxx";
                    = "1 0 1 0 1 1 0 0
                                       100x xxxx",
    chip_erase
                      timeout
                  = 200;
   stabdelay
                  = 100;
                        = 25;
   cmdexedelay
   synchloops
                        = 32;
                  = 0;
   bytedelay
   pollindex
                  = 3;
   pollvalue
                  = 0x53;
                  = 1;
   predelay
   postdelay
                  = 1;
   pollmethod
                        = 1;
   hvsp_controlstack
      0x4C, 0x0C, 0x1C, 0x2C, 0x3C, 0x64, 0x74, 0x66,
       0x11, 0x08, 0x04, 0x02, 0x03, 0x08, 0x04, 0x00;
   hventerstabdelay = 100;
   progmodedelay
                     = 0;
   hvspcmdexedelay
                     = 0;
                     = 6;
   synchcycles
                     = 1;
   latchcycles
                    = 1;
   togglevtg
                     = 25;
   poweroffdelay
   resetdelayms
resetdelayus
                     = 1;
                     = 0;
   hvleavestabdelay = 100;
resetdelay = 25;
   resetdelay
   chiperasepolltimeout = 40;
                    = 0;
   chiperasetime
   programfusepolltimeout = 25;
   programlockpolltimeout = 25;
   ocdrev
                      = 1;
    memory "eeprom"
                       = 256;
        size
        page size
                      = 4;
        min write delay = 4000;
        max_write_delay = 4500;
        readback_p1 = 0xff;
        readback_p2
                       = 0xff;
                       = "1 0 1 0 0 0 0 0
                                                   0 0 0 x x x x x",
        read
                        "a7 a6 a5 a4 a3 a2 a1 a0 oooo ooo";
```

```
= "1 1 0 0 0 0 0 0 0 0 0 0 x x x x x", "a7 a6 a5 a4 a3 a2 a1 a0 iiii iiii;
       write
                                                 1",
                 = " 1 1
                             0
                                 0
                                        0
                                           0 0
     loadpage lo
                   " 0
" 0
                                           0 0 0",
0 a1 a0",
                                                 0",
                        0
                             0
                                 0
                                        0
                      0
                          0
                             0
                                 0
                                        0
                   " i
                         i
                             i
                                 i
                                       i
                                           i
                                               i
                                                  i";
                  = " 1
                             0
                                 0
                                                 0",
                        1
                                       0 0 1
     writepage
                   " 0
                                       x x x x",
                        0 x x
                   " a7 a6 a5 a4
                                       a3 a2 0 0",
                   " x
                                      x x x x";
                         х х
                                x
                 = 0x41;
     mode
     delay
                 = 6;
     blocksize
               = 4;
     readsize
                 = 256;
    memory "flash"
      paged
                     = yes;
       size
                     = 4096;
                      = 64;
       page_size
                  = 64;
       num pages
       min_write_delay = 4500;
       max_write_delay = 4500;
                   = 0xff;
       readback p1
                      = 0xff;
       readback_p2
                      = " 0
       read lo
                              0
                                 1
                                    0
                                          0
                                             0 0
                                                    0",
                        " 0
                             0 0 0
                                          0 a10 a9 a8",
                        " a7 a6 a5 a4
                                         a3 a2 a1 a0",
                        " 0
                              0
                                 0
                                             0 0
                                                    o";
                                     0
                                          0
                      = " 0
       read hi
                              0
                                 1
                                      0
                                          1
                                             0
                                                0
                                                    0",
                        " 0
                              0
                                  0
                                     0
                                          0
                                             a10 a9 a8",
                        " a7
                                          a3 a2 a1 a0",
                             a6 a5 a4
                        11
                          0
                              0
                                 0
                                     0
                                          0
                                             0
                                                 0
                                                    o";
                                                    0",
                      = " 0
                                     0
                                          0
                                             0
                                                0
                              1
                                 0
       loadpage_lo
                                 0
                        " 0
                              0
                                     x
                                          x
                                             x
                                                 x
                                                     x",
                                          a3 a2 a1 a0",
                        " x
                              x
                                  x
                                     a4
                                 i
                        " i
                             i
                                                    i";
                                             i
                                                 i
                                     i
                                          i
                                                     0",
                      = " 0
                                             0 0
       loadpage hi
                              1
                                  Ω
                                     0
                                          1
                                 0 x
                                            x x x",
a2 a1 a0",
                        **
                          0
                              0
                                          x
                        **
                                  х а4
                                         a3
                           x
                              x
                             i
                        " i
                                  i
                                     i
                                          i
                                             i
                                                i
                                                    i";
                      = " 0 1 0 0 1 1 0 0",
       writepage
                        " 0 0 0 0 0 alo a9 a8",
" a7 a6 a5 x x x x x",
" x x x x x x x x";
                 = 0x41;
                 = 6;
     delay
     blocksize
                 = 32;
                = 256;
     readsize
   ATtiny45 has Signature Bytes: 0x1E 0x92 0x08. (Data sheet 2586C-AVR-06/05
(doc2586.pdf) indicates otherwise!)
    memory "signature"
       size
                      = "0 0 1 1
                                     0 0 0 0
                                                 0 0 0 x
                                                             x x x x",
       read
                       "x x x x x x a1 a0
                                                 0 0 0 0
                                                           0 0 0 0";
    memory "lock"
       size
                      = 1;
                      = "1 0 1 0 1 1 0 0 1 1 1 x x x x x x",
"x x x x x x x x x 1 1 i i i i i i;
       write
      min_write_delay = 9000;
```

```
max_write_delay = 9000;
    memory "lfuse"
       size
                     = 1;
                     = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
       write
                       "x x x x x x x x i i i i i i i i;
                     = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
       read
                       "x x x x x x x x 0 0 0 0 0 0 0 0";
      min write delay = 9000;
      max_write_delay = 9000;
    memory "hfuse"
                     = 1;
       size
                     = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
       write
                       "x x x x x x x x i i i i i i i i";
                     = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
       read
                      "x x x x x x x x 0 0 0 0 0 0 0 0";
      min write delay = 9000;
      max_write_delay = 9000;
    memory "efuse"
       size
                     = 1;
                     = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
       write
                       "x x x x x x x x x x x x x x i";
                     = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
       read
                      "x x x x x x x x 0 0 0 0 0 0 0 0";
      min write delay = 9000;
      max_write_delay = 9000;
    ;
    memory "calibration"
       size
                     = 2;
                      "0 0 1 1 1 0 0 0 0 0 0 x x x x x",
"0 0 0 0 0 0 0 a0 oooooo";
                     = "0 0 1 1
       read
          _____
# ATtiny85
#-----
part
    id
                = "t85";
    desc
                = "ATtiny85";
    has debugwire = yes;
    flash instr = 0xB4, 0x02, 0x12;
    eeprom_instr = 0xBB, 0xFF, 0xBB, 0xEE, 0xBB, 0xCC, 0xB2, 0x0D,
                0xBC, 0x02, 0xB4, 0x02, 0xBA, 0x0D, 0xBB, 0xBC,
                 0x99, 0xE1, 0xBB, 0xAC;
## no STK500 devcode in XML file, use the ATtiny45 one
  stk500_devcode = 0x14;
avr910_devcode = ?;
  Try the AT90S2313 devcode:
    avr910 devcode = 0x20;
    signature = 0x1e 0x93 0x0b;
    reset
                   = io;
    chip erase delay = 400000;
    pgm_enable
                  = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
                    = "1 0 1 0 1 1 0 0
    chip_erase
```

```
= 200;
timeout
               = 100;
stabdelay
                      = 25;
cmdexedelay
synchloops
                      = 32;
                = 0;
bytedelay
pollindex
               = 3;
pollvalue
               = 0x53;
predelay
                = 1;
                = 1;
postdelay
pollmethod
                      = 1;
hvsp_controlstack
    0x4C, 0x0C, 0x1C, 0x2C, 0x3C, 0x64, 0x74, 0x66, 0x68, 0x78, 0x68, 0x68, 0x7A, 0x6A, 0x68, 0x78,
    0x78, 0x7D, 0x6D, 0x0C, 0x80, 0x40, 0x20, 0x10,
    0x11, 0x08, 0x04, 0x02, 0x03, 0x08, 0x04, 0x00;
hventerstabdelay = 100;
hvspcmdexedelay
                   = 0;
                   = 6;
synchcycles
                   = 1;
latchcycles
togglevtg
                   = 1;
poweroffdelay
                  = 25;
resetdelayms
resetdelayus
                   = 1:
                   = 0;
hvleavestabdelay
                   = 100;
resetdelay
                   = 25;
chiperasepolltimeout = 40;
chiperasetime = 0;
programfusepolltimeout = 25;
programlockpolltimeout = 25;
ocdrev
                    = 1;
memory "eeprom"
                    = 512;
    size
    paged
                   = no;
    page size
                  = 4;
    min write delay = 4000;
    max_write_delay = 4500;
    readback_p1
                    = 0xff;
     readback_p2
                     = 0xff;
                     = "1 0 1 0
                                     0 0 0 0
                                                   0 0 0 x x x x a8",
     read
                      "a7 a6 a5 a4 a3 a2 a1 a0
                                                   0000 0000";
                                                  0 0 0 x x x x a8",
iiii iiiii;
     write
                     = "1 1 0 0
                                    0 0 0 0
                       "a7 a6 a5 a4 a3 a2 a1 a0
               = "
                     1
                        1
                             0
                                 0
                                        0
                                            0
                                                    1",
  loadpage_lo
                  "
                     0
                        0
                             0
                                 0
                                        0
                                            0
                                                0
                                                    0",
                  **
                     0
                        0
                             0
                                 0
                                        0
                                            0 a1 a0",
                  11
                             i
                                 i
                                        i
                                            i
                                                i
                                                    i";
                = " 1
                             0
                                 0
                                        0
                                            0
                                               1
                                                    0",
                       1
  writepage
                  " 0
                       0 x x
                                       х х х а8",
                  " a7 a6 a5 a4
                                       a3 a2 0 0",
                    x
                        х х
                                       x x x
                                                   x";
                               х
                = 0x41;
  mode
  delay
                = 12;
  blocksize
                = 4;
  readsize
               = 256;
 memory "flash"
    paged
                    = yes;
                    = 8192;
                    = 64;
     page_size
     num_pages
                    = 128;
     min write delay = 30000;
     max_write_delay = 30000;
     readback pl
                   = 0xff;
```

```
readback_p2
                   = 0xff:
                   = " 0
                          0
                             1
                                  0
                                      0 0 0
                                                 0",
    read lo
                     " 0
                          0 0 0 all al0 a9 a8",
                     " a7 a6 a5 a4
                                     a3 a2 a1 a0",
                     " 0
                          0
                             0
                                 0
                                      0
                                         0
                                            0
                                                o";
                   = " 0
    read hi
                           0
                              1
                                  0
                                      1
                                         0
                                             0
                                                 0",
                     " 0
                                  0 all al0 a9 a8",
                          0
                              0
                     " a7 a6 a5 a4
                                      a3 a2 a1 a0",
                     11
                                                 o";
                       0
                          0
                              0
                                       0
                                          0
                                             0
                                  0
                   = "
                       0
                              0
                                      0
                                          0
                                             0
                                                  0",
    loadpage lo
                           1
                                  0
                     11
                       0
                           0
                              0
                                                 х",
                                  x
                                      x
                                          x
                                             х
                             ж
                     " x
                                      a3 a2 a1 a0",
                           х
                                 a4
                     **
                       i
                           i
                             i
                                 i
                                      i
                                         i
                                             i
                                                 i";
                   = " 0
                                                 0",
                                         0
                           1
                              0
                                  0
                                      1
                                             0
    loadpage hi
                     "
                       0
                           0
                              0
                                  x
                                                 х",
                                      x
                                          х
                                             х
                                      a3 a2 a1 a0",
                     11
                       x
                           x
                              x
                                 a4
                     " i
                                                 i";
                              i
                                  i
                                      i
                                          i
                                             i
                           i
    writepage
                   = " 0 1 0 0
                                  1
                                      1 0 0",
                    " 0 0 0 0 all alo a9 a8",
" a7 a6 a5 x x x x x",
" x x x x x x x x x";
  mode
              = 0x41;
              = 6;
  delay
           = 32,
= 256;
  blocksize
  readsize
ATtiny85 has Signature Bytes: 0x1E 0x93 0x08.
memory "signature"
                   = 3;
    size
                   = "0 0 1 1
                                 0 0 0 0 0 0 0 x x x x x",
    read
                    "x x x x x x a1 a0 o o o o
                                                        0 0 0 0";
 memory "lock"
   size
                   = 1:
                   = "1 0 1 0 1 1 0 0 1 1 1 x x x x x x",
"x x x x x x x x x 1 1 i i i i i i;
    write
   min write delay = 9000;
   max write delay = 9000;
 memory "lfuse"
                   = 1;
    size
                   = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
    write
                    "x x x x x x x x i i i i i i i i;
                   read
   min write delay = 9000;
   max write delay = 9000;
 memory "hfuse"
                   = 1:
    size
                   = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0",
    write
                    "xxxx xxxx iiii iiiii";
                   = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
    read
                    "x x x x x x x x 0 0 0 0 0 0 0 0";
   min write delay = 9000;
   max write delay = 9000;
 memory "efuse"
                   = 1:
    size
                   = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
    write
```

```
"x x x x x x x x x x x x x i";
                                                                    = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
                         read
                                                                          "x x x x x x x x 0 0 0 0 0 0 0 0";
                     min write delay = 9000;
                     max write delay = 9000;
             memory "calibration"
                                                                   = 2;
                        size
                        read
                                                                   = "0 0 1 1 1 0 0 0
                                                                                                                                               0 0 0 x x x x x",
                                                                        "0 0 0 0 0 0 0 a0 0000 000";
              ;
 #-----
# ATmega640
# Almost same as ATmega1280, except for different memory sizes
part
          id
                                                        = "m640";
           desc
                                                        = "ATmega640";
                                                       = 0x1e 0x96 0x08;
           signature
          has_jtag
                                                       = yes;
          stk500_devcode = 0xB2;
            avr910 devcode = 0x43;
          chip_erase_delay = 9000;
          pagel
                                                        = 0xD7;
          bs2
                                                        = 0xA0;
          reset
                                                        = dedicated;
                                                     = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
          pqm enable
                                                            = "1 0 1 0 1 1 0 0 1 0 0 0 0 0 0 0",
           chip erase
                                                               "x x x x x x x x
                                                                                                                 xxxx xxxx";
           timeout
                                                      = 200;
                                                     = 100;
           stabdelay
           cmdexedelay
                                                                        = 25;
           synchloops
                                                                        = 32;
          bytedelay
                                                     = 0;
                                                     = 3;
           pollindex
           pollvalue
                                                     = 0x53;
          predelay
                                                     = 1;
           postdelay
                                                      = 1;
          pollmethod
                                                                        = 1;
          pp_controlstack
                      0 \\  \  \, x0 \\  \  \, E \,, \quad 0 \\  \  \, x1 \\  \  \, E \,, \quad 0 \\  \  \, x2 \\  \  \, F \,, \quad 0 \\  \  \, x2 \\  \  \, E \,, \quad 0 \\  \  \, x3 \\  \  \, E \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \ \, x3 \\  \  \, F \,, \quad 0 \\  \ \, x3 \\  \  \, F \,, \quad 0 \\  \ \, x3 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,
                      0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
                      0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
           hventerstabdelay = 100;
                                                               = 0;
           progmodedelay
          latchcycles
                                                               = 5;
           togglevtg
                                                                = 1;
                                                            = 15;
           poweroffdelay
           resetdelayms
                                                            = 1;
                                                            = 0;
= 15;
           resetdelayus
           hvleavestabdelay
           chiperasepulsewidth = 0;
           chiperasepolltimeout = 10;
          programfusepulsewidth = 0;
          programfusepolltimeout = 5;
           programlockpulsewidth = 0;
           programlockpolltimeout = 5;
           idr
                                                                = 0x31:
           spmcr
                                                                = 0x57;
```

```
= 0x3b:
rampz
allowfullpagebitstream = no;
ocdrev
                = 3;
memory "eeprom"
                = no; /* leave this "no" */
  paged
   page_size
                = 8; /* for parallel programming */
                = 4096;
   size
   min_write delay = 9000;
   max write delay = 9000;
                = 0x00;
   readback_p1
   readback p2
                = 0x00;
                = " 1
                        0 1
                             0
                                   0 0 0 0",
   read
                  " x x x x
                                   all al0 a9 a8",
                  " a7 a6 a5 a4
                                   a3 a2
                                           a1
                                              a0",
                  " 0 0
                                              0";
                          0
                               0
                                    0 0
                = " 1
                                    0 0
   write
                        1
                           0
                               0
                                          0
                                              0",
                  " x
                                   all al0 a9 a8",
                       х
                          x
                              х
                  " a7 a6
                         a5 a4
                                    a3 a2 a1 a0",
                    i
                        i
                           i
                              i
                                    i
                                       i
                                          i
                                              i";
  loadpage lo = " 1
                    1
                        0
                           0
                                 0
                                    0
                                        0
                                           1",
                                          0",
                0
                    0
                                      0
                        0
                           0
                                 0
                                    0
               " 0
                   0
                        0
                           0
                                 0 a2 a1 a0",
               " i
                   i i
                           i
                                   i
                                       i i";
  writepage
             = " 1
                    1
                        0
                           0
                                 0
                                    0
                                       1
                                          0",
               " 0
                   0
                               all al0 a9 a8",
                       x
                          x
               " a7 a6 a5 a4
                               a3 0 0 0",
               " x
                                x x x x";
                   x x x
             = 0x41;
  mode
             = 10;
  delay
  blocksize
             = 8;
 readsize
            = 256;
memory "flash"
  paged
                = yes;
                = 65536;
   size
             = 256;
  page size
   num_pages
               = 256;
   min_write_delay = 4500;
   max write delay = 4500;
                = 0x00;
   readback p1
                = 0x00;
   readback_p2
                = " 0 0 1 0
                                    0 0 0 0",
   read_lo
                  " 0 a14 a13 a12
                                              a8",
                                   a11 a10 a9
                  " a7 a6 a5 a4
                                   a3 a2
                                           a1
                                              a0",
                  " 0
                       0
                           0
                                     0
                                               o";
   read hi
                = " 0 0 1
                               0
                                    1 0
                                          0
                                              0",
                  " 0 a14 a13 a12
                                   all al0 a9 a8",
                  " a7 a6 a5 a4
                                   a3 a2
                                           a1
                                              a0",
                           0
                                    0
                = " 0
                           0
                               0
                                    0
                                       0
                                               0",
   loadpage lo
                  " x x
                             х
                                    x x x
                                              х",
                    x a6 a5 a4
                                    a3 a2 a1
                                              a0",
                                               i";
                           i
                                     i
                                       i
                = " 0
                       1
                           0
                              0
                                    1
                                       0 0
                                               0",
   loadpage_hi
                  " X
                      x
                          х
                             х
                                    х х х
                                              x",
                                             a0",
                  11
                    x a6 a5 a4
                                    a3 a2 a1
                  11
                    i
                       i
                          i
                              i
                                    i
                                       i
                                          i
                                              i";
                = " 0 1 0 0
                                              0",
                                    1 1 0
   writepage
                                   all al0 a9 a8",
                 " 0 a14 a13 a12
```

```
" a7
                                                       x",
                              х х
                                     х
                                            х х
                                                   х
                             х х х
                                           x
                                              х
                                                  х
                                                      x";
     mode
                 = 0x41;
                 = 10;
     delay
     blocksize
               = 256;
     readsize
                 = 256;
   memory "lfuse"
      size
                     = 1;
                     = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
       write
                       "x x x x x x x x i i i i i i i i";
                     = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
      read
                       "x x x x x x x x x 0 0 0 0 0 0 0 0";
      min write delay = 9000;
      max write delay = 9000;
   memory "hfuse"
      size
                     = 1;
                     = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
"x x x x x x x x i i i i i i i i;;
       write
      read
                     = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
                       "x x x x x x x x 0 0 0 0 0 0 0 0";
      min_write_delay = 9000;
      max write delay = 9000;
   memory "efuse"
      size
                     = 1;
                     = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
       write
                       "xxxx xxxx xxxx xiii";
                     = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
      read
                       "x x x x x x x x o o o o o o o o";
      min_write_delay = 9000;
      max write delay = 9000;
   memory "lock"
      size
                     = 1;
                     = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
       read
                       "x x x x x x x x x x o o o o o o";
                     = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
      write
                      "x x x x x x x x 1 1 i i i i i i;
      min_write_delay = 9000;
      max write delay = 9000;
   memory "calibration"
     size
                     = 1;
                     read
   memory "signature"
                     = 3;
     size
                     = "0 0 1 1 0 0 0 0
                                               x x x x x x x x x",
o o o o o o o o o";
       read
                      "x x x x
                                   x x a1 a0
# ATmega1280
```

```
part
                   = "m1280";
   id
                   = "ATmega1280";
   desc
   signature
                  = 0x1e 0x97 0x03;
   has jtag
                  = yes;
   stk500_devcode = 0xB2;
avr910_devcode = 0x43;
   chip erase delay = 9000;
                   = 0xD7;
   pagel
   bs2
                   = 0xA0;
   reset
                   = dedicated;
                                        0 1 0 1 0 0 1 1",
                   = "1 0 1 0 1 1 0 0
   pgm_enable
                     "x x x x x x x x
                                        xxxx xxxx";
                   = "1 0 1 0 1 1 0 0 1 0 0 0 0 0 0",
   chip_erase
                     "xxxx xxxx xxxx xxxx";
   timeout
                  = 200;
   stabdelay
                  = 100;
   cmdexedelay
   synchloops
   bytedelay
                  = 0;
   pollindex
                  = 3:
                  = 0x53;
   pollvalue
   predelay
                  = 1;
   postdelay
                  = 1:
   pollmethod
                         = 1;
   pp_controlstack
       0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
       0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
       0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
       0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
   hventerstabdelay = 100;
   progmodedelay
                      = 0;
                     = 5;
   latchcycles
   togglevtg
                     = 1;
   poweroffdelay
                    = 15;
   resetdelayms
                      = 1;
   resetdelayus
                      = 0;
                    = 15;
   hvleavestabdelay
   chiperasepulsewidth = 0;
   chiperasepolltimeout = 10;
   programfusepulsewidth = 0;
   programfusepolltimeout = 5;
   programlockpulsewidth = 0;
   programlockpolltimeout = 5;
   idr
                      = 0x31;
                      = 0x57;
   spmcr
   rampz
                      = 0x3b;
   allowfullpagebitstream = no;
   ocdrev
                      = 3;
   memory "eeprom"
                      = no; /* leave this "no" */
       paged
                    = 8; /* for parallel programming */
       page size
                      = 4096;
       size
       min write delay = 9000;
       max write delay = 9000;
                      = 0x00;
       readback p1
       readback_p2
                      = 0x00;
                      = " 1
                               0 1 0
                                            0 0 0
                                                        0",
       read
                        " x x x x
                                           all al0 a9 a8",
                        " a7 a6 a5 a4
                                                       a0",
                                            a3 a2 a1
                        " 0 0
                                 0
                                     0
                                            0 0
                                                   0
                                                        0";
                      = " 1 1
       write
                                  0
                                     0
                                            0 0
                                                   0
                                                        0".
                        " x
                                           all al0 a9 a8",
                              х
                                  х
                                      х
```

```
a0",
                  " a7
                       a6
                          a5
                              a4
                                   a3 a2
                                          a1
                    i
                       i
                                       i
                                              i";
                           i
                              i
                                    i
                                          i
  loadpage_lo
            = " 1
                   1
                        0
                           0
                                 0
                                   0
                                      0
                                          1",
               " 0
                           0
                                0
                                   0
                                      0
                                         0",
              " 0
" i
                        0
                                0 a2 a1 a0",
                   0
                           0
                   i
                       i
                           i
                                i
                                   i
                                       i
                                          i";
                                         0",
             = " 1 1
                        0
                           0
                                0 0 1
  writepage
              " 0 0 x x
                             a11 a10 a9 a8",
               " a7 a6 a5 a4 a3 0 0 0",
               " x x x x
                               x x x x";
             = 0x41;
  mode
  delay
            = 10;
  blocksize
            = 8;
  readsize
            = 256;
memory "flash"
  paged
               = yes;
   size
               = 131072;
             = 256;
= 512;
   page_size
   num pages
   min_write_delay = 4500;
   max_write_delay = 4500;
              = 0x00;
   readback p1
                = 0x00;
   readback_p2
                = " 0
                          1 0
   read lo
                       0
                                   0 0
                                          0
                                             0",
                                  a11 a10 a9
                  "a15 a14 a13 a12
                                              a8",
                                  a3 a2 a1 a0",
                  " a7 a6 a5 a4
                  " 0
                                              o";
                      0
                          0
                                    0 0
                                          0
                              0
                = " 0 0 1 0
   read hi
                                   1 0
                                          0
                                              0",
                  "a15 a14 a13 a12
                                   a11 a10
                                          a9
                                             a8",
                  " a7 a6 a5 a4
                                  a3 a2 a1
                                              a0",
                  " 0
                       0
                          0
                              0
                                    0 0
                                          0
                                              0";
                = " 0
                           0
                              0
                                    0 0
                                              0",
                       1
                                          0
   loadpage_lo
                  11
                    x
                       x
                          x
                              x
                                    x
                                       x
                                          x
                                              x",
                                   x x
a3 a2
                  " x a6
                          a5 a4
                                          a1
                                              a0",
                  " i
                                              i";
                       i
                          i
                              i
                                      i
                                          i
                                    i
                                              0",
                = " 0
                             0
   loadpage hi
                       1
                           0
                                    1
                                       0 0
                  "
                             х
                                   x x x
a3 a2 a1
                                             x",
                    х х
                          x
                  11
                    x a6 a5 a4
                                              a0",
                    i
                       i
                                      i
                                              i";
                          i
                              i
                                   i
                                          i
                = " 0 1 0 0
                                              0",
   writepage
                                   1 1 0
                  "a15 a14 a13 a12
                                  all al0 a9 a8",
                  x x x x x x
                                              x",
                                              x";
  mode
             = 0x41;
  delay
             = 10;
  blocksize
            = 256;
            = 256;
  readsize
memory "lfuse"
                = 1;
  size
   write
                = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
                  "xxxx xxxx iiii iiiii";
                = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0",
                 "x x x x x x x x 0 0 0 0 0 0 0 0";
   min_write delay = 9000;
   max write delay = 9000;
```

```
memory "hfuse"
      size
                    = 1;
                    = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
       write
                      "x x x x x x x x i i i i i i i i";
                    read
                      "x x x x x x x x o o o o o o o o";
      min write delay = 9000;
      max_write_delay = 9000;
   memory "efuse"
      size
                    = 1;
                    = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
      write
                      "x x x x x x x x x x x x i i i";
                    = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
      read
                      "x x x x x x x x o o o o o o o o";
      min_write_delay = 9000;
      max_write_delay = 9000;
   memory "lock"
                    = 1;
      size
                    = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
      read
                      "x x x x x x x x x x o o o o o o";
                    = "1 0 1 0 1 1 0 0 1 1 1 x x x x x x",
"x x x x x x x x x 1 1 i i i i i i;";
      write
      min write delay = 9000;
      max write delay = 9000;
   memory "calibration"
      size
                    = 1;
                    = "0 0 1 1 1 0 0 0 xxxx xxxx",
      read
                     memory "signature"
      size
                    = 3;
                    = "0 0 1 1 0 0 0 0 x x x x x x x x x,",
      read
                     "x x x x x x a1 a0 o o o o o o o";
# ATmega1281
#-----
# Identical to ATmega1280
part parent "m1280"
                = "m1281";
  id
                = "ATmega1281";
                = 0x1e 0x97 0x04;
   signature
   ocdrev
                   = 3;
# ATmega2560
part
   id
                 = "m2560";
                = "ATmega2560";
   desc
   signature = 0xle 0x98 0x01;
has_jtag = vae:
   stk500 devcode = 0xB2;
  avr910 devcode = 0x43;
```

```
chip_erase_delay = 9000;
pagel
                 = 0xD7;
bs2
                 = 0xA0;
reset
                 = dedicated;
                 = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
pgm enable
                   "x x x x x x x x x x x x x x x x ;
chip_erase
                 = "1 0 1 0 1 1 0 0
                                        1000 0000",
                   "x x x x x x x x
                                        x x x x x x x x";
timeout
                = 200;
stabdelay
                = 100;
                       = 25;
cmdexedelay
                       = 32;
synchloops
                = 0;
bytedelay
pollindex
                = 3;
                = 0x53;
pollvalue
predelay
                = 1;
postdelay
                = 1;
                       = 1;
pollmethod
pp_controlstack
    0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F, 0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
    0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x02;
hventerstabdelay = 100;
                    = 0;
progmodedelay
latchcycles
                    = 5;
togglevtg
                    = 1;
                   = 15;
poweroffdelay
                    = 1;
resetdelayms
                   = 0;
resetdelayus
                   = 15;
hvleavestabdelay
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
idr
                    = 0x31;
                    = 0x57;
spmcr
rampz
                    = 0x3b;
allowfullpagebitstream = no;
ocdrev
                    = 4;
memory "eeprom"
                    = no; /* leave this "no" */
   paged
    page_size
                    = 8; /* for parallel programming */
    size
                    = 4096;
    min_write_delay = 9000;
    max_write_delay = 9000;
    readback_p1
                    = 0x00;
    readback_p2
                    = 0x00;
    read
                    = " 1
                             0
                                 1
                                     0
                                            0 0
                                                    0
                                                         0",
                      " x
                                                        a8",
                            x
                                х х
                                           a11 a10 a9
                      " a7 a6 a5 a4
                                           a3 a2 a1
                      " 0
                                0
                                            0 0
                    = " 1
                             1
                                  0
                                     0
                                            0
                                               0
                                                         0",
    write
                                                    0
                      " x
                                           all al0 a9 a8",
                                x
                             x
                                     x
                      " a7 a6 a5 a4
                                           a3 a2 a1 a0",
                         i
                             i
                                  i
                                             i
                                                         i";
                                  0
                         1
                             0
                                         0
                                            0
                                                 0
                                                     1",
   loadpage lo
                     1
                  11
                     0
                         0
                              0
                                  0
                                         0
                                            0
                                                0
                                                     0",
                  "
                                                    a0",
                     0
                         0
                              0
                                  0
                                         0
                                            a2 a1
                                                     i";
                  11
                     i
                         i
                              i
                                  i
                                         i
                                             i
                                                 i
```

```
= " 1 1
                       0
                          0
                              0 0 1
a11 a10 a9 a8",
                                0 0 1
                                          0",
  writepage
               " 0
                   0 ж ж
               " x x x x x x x x ...
  mode
             = 0x41;
  delay
             = 10;
            = 8;
  blocksize
           = 256;
  readsize
memory "flash"
  paged
                = yes;
               = 262144;
   size
   num_pages = 100:
  page size
               = 1024;
   min_write_delay = 4500;
   max_write_delay = 4500;
   readback_p1 = 0x00;
   readback_p2
               = 0x00;
   read_lo
                = " 0 0 1 0 0 0 0",
                  "a15 a14 a13 a12
                                   all al0 a9 a8",
                                  a3 a2 a1
                                              a0",
                  " a7 a6 a5 a4
                  " 0
                       0
                          0
                              0
                                   0 0
                                              o";
                = " 0 0 1 0
   read hi
                                    1 0 0 0",
                  "a15 a14 a13 a12
                                   all al0 a9 a8",
                  " a7 a6 a5 a4
                                  a3 a2 a1
                                              a0",
                  " 0
                                    0
                                              0";
                = " 0 1
                          0 0
                                   0 0 0 0",
   loadpage lo
                  " x x x x
                                             x",
                                    х х х
                  " x a6 a5 a4
                                    a3 a2 a1
                                             a0",
                  11
                       i
                           i
                              i
                                    i
                                       i
                                              i";
                = " 0 1 0
                             0
                                   1 0 0
                                             0",
   loadpage hi
                  " x x x x
                                    х х х
                                             x",
                  " x a6 a5 a4
                                    a3 a2 a1 a0",
                       i
                           i
                              i
                                    i i i
                                              i";
                = " 0 1 0 0
                                    1 1 0 0",
   writepage
                  "a15 a14 a13 a12
                                   all al0 a9 a8",
                  " a7 x x x
                                   x x x x",
                  " x x x x
                                             x";
                                   х х х
                  " 0 1 0 0 1 1 0 1",
" 0 0 0 0 0 0 0 0 0 0",
" 0 0 0 0 0 0 0 0 al6",
" 0 0 0 0 0
                = " 0 1 0 0
   load ext addr
  mode
             = 0x41;
            = 10;
  delay
  blocksize
           = 256;
            = 256;
  readsize
memory "lfuse"
  size
                = 1;
                = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
   write
                  "x x x x x x x x i i i i i i i i i;
                = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0,
   read
                 "x x x x x x x x 0 0 0 0 0 0 0 0";
   min write delay = 9000;
  max_write_delay = 9000;
memory "hfuse"
   size
                = 1;
```

```
= "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
       write
                       "x x x x x x x x i i i i i i i i;
                     = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
       read
                      "x x x x x x x x 0 0 0 0 0 0 0 0";
      min write delay = 9000;
      max_write_delay = 9000;
   memory "efuse"
      size
                     = 1;
                     = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
       write
                      "x x x x x x x x x x x x i i i";
                     = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
      read
                      "x x x x x x x x 0 0 0 0 0 0 0 0";
      min write delay = 9000;
      max write delay = 9000;
   memory "lock"
      size
                    = 1;
                    = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
"x x x x x x x x x x x x x 0 0 0 0 0 0;
       read
                     = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
      write
                      "xxxx xxxx 11ii iiii";
      min_write_delay = 9000;
      max write delay = 9000;
   memory "calibration"
     size = 1;
                     read
   memory "signature"
     size
                     = 3;
                     = "0 0 1 1 0 0 0 0
                                              x x x x x x x x x",
o o o o o o o o";
       read
                      "x x x x
                                  x x a1 a0
# ATmega2561
#-----
part parent "m2560"
  id = "m2561";

desc = "ATmega2561";

signature = 0x1e 0x98 0x02;
   ocdrev
                    = 4;
#-----
# ATmega128RFA1
# Identical to ATmega2561 but half the ROM
part parent "m2561"
  id = "m128rfa1";
desc = "ATmega128RFA1";
signature = 0x1e 0xa7 0x01;
   chip_erase_delay = 55000;
   bs2
                  = 0xE2;
   ocdrev
                     = 3;
```

```
memory "flash"
                  = yes;
= 131072;
      paged
      size
      page_size = 256;
num_pages = 512;
      min_write_delay = 50000;
      max_write_delay = 50000;
      readback_p1 = 0x00;
readback_p2 = 0x00;
      readback_p2
                   = 0x00;
                    = " 0 0 1 0
                                       0 0 0 0",
      read lo
                     "a15 a14 a13 a12
                                      all al0 a9 a8",
                      " a7 a6 a5 a4
                                    a3 a2 a1 a0",
                      " 0
                          0 0
                                 0
                                       0 0 0
                                                  0";
                    = " 0 0 1 0
      read hi
                                       1 0 0
                     "a15 a14 a13 a12
                                      all al0 a9 a8",
                      " a7 a6 a5 a4
                                      a3 a2 a1 a0",
                      " 0 0 0 0
                                       0 0 0 0";
                    = " 0 1 0 0
                                       0 0 0 0",
      loadpage_lo
                      " x x x x
                                       x x x x",
                      " x a6 a5 a4 a3 a2 a1 a0",
                                                 i";
                      " i i i i
                                      i i i
                    = " 0 1 0 0
                                       1
                                           0 0 0",
      loadpage_hi
                                       x x x x",
                      " x x x x
                      " x a6 a5 a4
                                       a3 a2 a1 a0",
                      " i
                                       i i i
                             i
                                 i
                                                 i";
                          i
                    = " 0 1 0 0
                                       1 1 0 0",
      writepage
                     "a15 a14 a13 a12
                                      all al0 a9 a8",
                                      x x x x",
                     " а7 х х х
                      " x x x x
                                       x x x x";
                = 0x41;
     mode
                = 20;
     delay
     blocksize = 256;
     readsize
               = 256;
# ATmega256RFR2
part parent "m2561"
                 = "m256rfr2";
   id
   desc = "ATmega256RFR2";
signature = 0x1e 0xa8 0x02;
   chip_erase_delay = 55000;
                 = 0xE2;
   ocdrev
                   = 4;
# ATmega128RFR2
part parent "m128rfa1"
   id = "m128rfr2";
desc = "ATmega128RFR2";
   signature
                = 0x1e 0xa7 0x02;
   ocdrev
                  = 3;
```

```
# ATmega64RFR2
part parent "m128rfa1"
                = "m64rfr2";
   desc
   \begin{array}{lll} \text{desc} & = \text{"ATmega64RFR2"}; \\ \text{signature} & = 0 \text{x1e } 0 \text{xa6 } 0 \text{x02}; \end{array}
   ocdrev
                  = 3;
   memory "flash"
     paged
                  = yes;
                  = 65536;
      size
      page_size = 256;
num_pages = 256;
      page size
      min_write_delay = 50000;
      max_write_delay = 50000;
      readback_p1 = 0x00;
readback_p2 = 0x00:
                   = 0x00;
      readback_p2
      read_lo
                   = " 0 0 1 0
                                      0 0 0 0",
                     " 0 a14 a13 a12
                                     all al0 a9 a8",
                                    a3 a2 a1 a0",
                     " a7 a6 a5 a4
                     " 0
                             0
                          0
                                0
                                      0 0
                   = " 0 0 1 0
      read hi
                                      1 0 0 0",
                     " 0 a14 a13 a12
                                    a11 a10 a9 a8",
                     " a7 a6 a5 a4
                                     a3 a2 a1 a0",
                       0 0
                             0 0
                                      0 0 0 0";
                                      0 0 0 0",
                   = " 0 1 0 0
      loadpage_lo
                     " x x x x
                                      x x x x",
                     " x a6 a5 a4 a3 a2 a1 a0",
" i i i i i i i i;
                   = " 0 1 0 0
                                      1 0 0 0",
      loadpage_hi
                     " x x x x
                                      x x x x",
                     " x a6 a5 a4
                                     a3 a2 a1 a0",
                                      i i i i";
                   = " 0 1 0 0
                                      1 1 0 0",
      writepage
                     " 0 a14 a13 a12
                                     all al0 a9 a8",
                                     x x x x x",
x x x x x";
                     " а7 х х х
                     " x x x x
     mode
                = 0x41;
               = 20;
     delay
     blocksize = 256;
     readsize
               = 256;
#-----
# ATmega2564RFR2
#-----
part parent "m256rfr2"
  id = "m2564rfr2";
desc = "ATmega2564R
               = "ATmega2564RFR2";
               = 0x1e 0xa8 0x03;
# ATmega1284RFR2
#-----
part parent "m128rfr2"
         = "m1284rfr2";
   id
                = "ATmega1284RFR2";
   desc
   signature = 0x1e 0xa7 0x03;
```

```
_____
# ATmega644RFR2
#-----
part parent "m64rfr2"
                 = "m644rfr2";
   id
                = "ATmega644RFR2";
   desc
                = 0x1e 0xa6 0x03;
   signature
#-----
# ATtiny24
          part
    id
               = "t24";
               = "ATtiny24";
    desc
    has_debugwire = yes;
    flash_instr = 0xB4, 0x07, 0x17;
    eeprom_instr = 0xBB, 0xFF, 0xBB, 0xEE, 0xBB, 0xCC, 0xB2, 0x0D,
               0xBC, 0x07, 0xB4, 0x07, 0xBA, 0x0D, 0xBB, 0xBC, 0x99, 0xE1, 0xBB, 0xAC;
## no STK500 devcode in XML file, use the ATtiny45 one
  stk500_devcode = 0x14;
avr910_devcode = ?;
## Try the AT90S2313 devcode:
   avr910_devcode = 0x20;
    chip_erase_delay = 4500;
                                   0 1 0 1 0 0 1 1",
                 = "1 0 1 0 1 1 0 0
    pgm_enable
                    "x x x x x x x x
                                   xxxx xxxx";
                  = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
    chip_erase
                    timeout
                = 200;
   stabdelay
                = 100;
   cmdexedelay
   synchloops
   bytedelay
                = 0;
   pollindex
                = 3;
                = 0x53;
   pollvalue
                = 1;
   predelay
   postdelay
                = 1;
   pollmethod
                     = 1;
   hvsp_controlstack
      0x4C, 0x0C, 0x1C, 0x2C, 0x3C, 0x64, 0x74, 0x66,
      0x68, 0x78, 0x68, 0x68, 0x7A, 0x6A, 0x68, 0x78,
      0x78, 0x7D, 0x6D, 0x0C, 0x80, 0x40, 0x20, 0x10,
      0x11, 0x08, 0x04, 0x02, 0x03, 0x08, 0x04, 0x0F;
   hventerstabdelay = 100;
   hvspcmdexedelay
                   = 0;
   synchcycles
                  = 6;
                  = 1;
   latchcycles
                  = 1;
   togglevtg
   resetdelayms
resetdelayus
   poweroffdelay
                   = 25;
                   = 0;
                   = 70;
   hvleavestabdelay = 100;
resetdelay = 25;
   resetdelay
   chiperasepolltimeout = 40;
   chiperasetime = 0;
   programfusepolltimeout = 25;
   programlockpolltimeout = 25;
```

```
= 1;
ocdrev
memory "eeprom"
                 = 128;
   size
  paged
                 = no;
  page_size
                = 4;
    min_write_delay = 4000;
    max write delay = 4500;
                  = 0xff:
   readback_p1
    readback_p2
                  = 0xff;
                  = "1 0 1 0
                                0 0 0 0
                                             0 0 0 x x x x x",
    read
                    "x a6 a5 a4 a3 a2 a1 a0
                                             0000 0000";
                  = "1 1 0 0 0 0 0 0
                                             000x xxxx",
    write
                    "x a6 a5 a4 a3 a2 a1 a0
                                             iiii iiii";
              = "
                                       0
                                           0
                                               1",
  loadpage lo
                  1
                      1
                          0
                             0
                                    0
                  0
                      0
                          0
                             0
                                    0
                                       0
                                          0
                                              0",
                                       0 a1 a0",
                  0
                      0
                          0
                             0
                                    0
                                              i";
                11
                  i
                      i
                          i
                             i
                                   i
                                          i
                                       i
              = " 1
  writepage
                     1
                          0
                             0
                                   0
                                       0
                                           1
                                               0",
                                   x x x x",
a3 a2 0 0",
                     0 x x a a 6 a 5 a 4
                  0
                " x
                                      x x x";
                " x
                     х
                         x
                            x
                                   x
  mode
              = 0x41;
              = 6;
  delay
  blocksize
             = 4;
             = 256;
  readsize
memory "flash"
   paged
                  = yes;
                  = 2048;
    size
                  = 32;
    page size
                 = 64;
    num_pages
    min_write_delay = 4500;
    max write delay = 4500;
    readback_p1 = 0xff;
    readback_p2
                  = 0xff;
                                                0",
                  = " 0
                                          0
                                            0
    read lo
                           0
                              1
                                  0
                                      0
                                          0 a9 a8",
                    " 0
                             0
                         0
                                      0
                                 0
                    " a7
                          a6 a5 a4
                                     a3 a2 a1 a0",
                      0
                           0
                              0
                                  0
                                      0
                                          O
                                              0
                                                 o";
    read hi
                   = " 0
                           0
                              1
                                  0
                                      1
                                          0
                                             0
                                                 0",
                    " 0
                          0
                             0
                                 0
                                      0
                                         0 a9 a8",
                    " a7
                          a6
                             a5
                                 a4
                                      a3 a2 a1 a0",
                    11
                      0
                           0
                              0
                                  0
                                          0
                                            0 0";
    loadpage_lo
                  = "
                      0
                           1
                              0
                                  0
                                      0
                                          0
                                             0
                                                 0",
                    " 0
                             0
                                                x",
                           0
                                  x
                                      x
                                         x
                                             x
                    **
                         х х
                                     a3 a2 a1 a0",
                      x
                                  х
                    " i
                                                 i";
                  = "
                                          0
                                                 0",
                       0
                           1
                              0
                                  0
                                      1
                                             0
    loadpage_hi
                    11
                      0
                           0
                              0
                                  x
                                      x
                                         x
                                             x
                                                 x",
                                      a3
                                         a2 a1
                                                a0",
                      х
                           x
                              x
                                  x
                    11
                                                 i";
                              i
                                      i
                                          i
                                             i
                  = " 0 1 0 0
                                   1 1 0 0",
    writepage
                    " 0
                         0 0 0
                                   0
                                     0 a9 a8",
                    " a7 a6 a5 a4
                                   x x x x",
                    " x x x x
                                  x x x x";
              = 0x41;
  mode
  delay
              = 6;
              = 32;
  blocksize
  readsize
              = 256;
```

```
ATtiny24 has Signature Bytes: 0x1E 0x91 0x0B.
    memory "signature"
       size
                      = "0 0 1 1 0 0 0 0 0 0 0 x x x x x x",
       read
                        "x x x x x x a1 a0 0 0 0 0 0 0 0";
    memory "lock"
       size
                      = 1;
                      = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
        write
                       "x x x x x x x x x x x x x i i";
                      = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
                       min write delay = 9000;
      max write delay = 9000;
    memory "lfuse"
                      = 1;
       size
                      = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
        write
                        "xxxx xxxx iiii iiiii";
                      = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0,
                        "x x x x x x x x x o o o o o o o o";
       min write delay = 9000;
       max write delay = 9000;
    memory "hfuse"
                      = 1;
       size
                      = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
        write
                        "xxxx xxxx iiii iiiii";
       read
                      = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
                        "x x x x x x x x 0 0 0 0 0 0 0 0";
       min write delay = 9000;
       max write delay = 9000;
    memory "efuse"
       size
                      = 1;
                      = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
        write
                        "x x x x x x x x x x x x x x i";
                      = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
       read
                       "x x x x x x x x o o o o o o o o";
       min write delay = 9000;
       max write delay = 9000;
    memory "calibration"
       size
                      = 1;
                      = "0 0 1 1 1 0 0 0 0 0 0 x x x x x x",
        read
                        "0 0 0 0 0 0 a0 oooooo";
# ATtiny44
part
    id
                = "t44";
                = "ATtiny44";
    desc
    has debugwire = yes;
    flash_instr = 0xB4, 0x07, 0x17;
    eeprom_instr = 0xBB, 0xFF, 0xBB, 0xEE, 0xBB, 0xCC, 0xB2, 0x0D,
                  0xBC, 0x07, 0xB4, 0x07, 0xBA, 0x0D, 0xBB, 0xBC, 0x99, 0xE1, 0xBB, 0xAC;
## no STK500 devcode in XML file, use the ATtiny45 one
    stk500 devcode = 0x14;
```

```
= ?;
avr910_devcode
Try the AT90S2313 devcode:
 avr910 devcode = 0x20;
signature
                = 0x1e 0x92 0x07;
                 = io;
reset
 chip_erase_delay = 4500;
pgm_enable
                 = "1 0 1 0 1 1 0 0
                                       0 1 0 1 0 0 1 1",
                                      x x x x x x x x";
                  "x x x x x x x x
 chip erase
                 = "1 0 1 0 1 1 0 0
                                    100x xxxx",
                   = 200;
timeout
               = 100;
stabdelay
cmdexedelay
                     = 25;
                     = 32;
synchloops
bytedelay
               = 0;
pollindex
               = 3;
              = 0x53;
pollvalue
predelay
               = 1;
postdelay
               = 1;
pollmethod
                     = 1:
hvsp_controlstack
   0x4C, 0x0C, 0x1C, 0x2C, 0x3C, 0x64, 0x74, 0x66,
   0x68, 0x78, 0x68, 0x68, 0x7A, 0x6A, 0x68, 0x78,
   0x78, 0x7D, 0x6D, 0x0C, 0x80, 0x40, 0x20, 0x10, 0x11, 0x08, 0x04, 0x02, 0x03, 0x08, 0x04, 0x0F;
hventerstabdelay = 100;
                  = 0;
hvspcmdexedelay
                 = 6;
synchcycles
latchcycles
                  = 1;
togglevtg
                  = 1;
poweroffdelay
                  = 25;
resetdelayms
resetdelayus
                 = 0;
                 = 70;
hvleavestabdelay
                 = 100;
resetdelay
                  = 25;
chiperasepolltimeout = 40;
chiperasetime = 0;
programfusepolltimeout = 25;
programlockpolltimeout = 25;
ocdrev
                  = 1:
 memory "eeprom"
                   = 256;
   size
   paged
                  = no;
                  = 4;
   page_size
    min_write_delay = 4000;
    max_write_delay = 4500;
                  = 0xff;
    readback_p1
    readback_p2
                    = 0xff;
                   = "1 0 1 0 0 0 0 0
    read
                                                000x xxxx",
                     "a7 a6 a5 a4 a3 a2 a1 a0 oooo ooo";
                    = "1 1 0 0 0 0 0 0
                                                0 0 0 x x x x x",
    write
                     "a7 a6 a5 a4 a3 a2 a1 a0 iiii iiii";
               = "
                               0
                                      0
                                          0
                                              0
                                                 1",
                    1
                       1
                           0
  loadpage_lo
                                                 0",
                 11
                       0
                           0
                               0
                                      0
                                          0
                                              0
                    0
                                          0 a1
                                                a0",
                   0
                       0
                           0
                               0
                                      0
                 "
                           i
                                                 i";
                   i
                       i
                               i
                                      i
                                          i
                                             i
               = "
                       1
                               0
                                                 0",
  writepage
                   1
                           0
                                      0
                                          0
                                             1
                 "
                                                 x",
                   0
                       0
                                         x
a2
                          х
                              х
                                     х
                                             х
                      0 x
a6 a5
                 11
                   x
                              a4
                                     a3
                                             0
                                                 0",
                 " x
                                         x
                                                 x";
                       х
                          x
                              x
                                     x
                                             х
```

```
= 0x41:
     mode
                = 6;
     delay
               = 4;
     blocksize
               = 256;
     readsize
    memory "flash"
      paged
                    = yes;
       size
                    = 4096;
                    = 64;
       page_size
                    = 64;
       num_pages
       min write delay = 4500;
       max_write_delay = 4500;
                  = 0xff;
       readback_p1
                    = 0xff;
       readback p2
                    = " 0
                                               0",
       read lo
                           0 1 0
                                     0
                                         0 0
                      " 0 0 0 0
                                      0 a10 a9 a8",
                      " a7 a6 a5 a4
                                      a3 a2 a1 a0",
                      11
                        0
                            0
                               0
                                  0
                                          0
                                                 0";
                                      0
                                             0
                                                0",
       read_hi
                    = " 0
                            0
                                  0
                                      1
                                         0 0
                              1
                                      0 a10 a9 a8",
                      " 0
                          0
                              0
                                 0
                      " a7 a6 a5 a4
                                      a3 a2 a1 a0",
                                         0 0 0";
                        0
                           0 0
                                  0
                                      0
                    = " 0
                                  0
                                         0 0 0",
       loadpage_lo
                            1
                               0
                                      0
                      " 0
                                         x x x",
                            0 0 x
                                      х
                      " x
                           х х а4
                                      a3 a2 a1 a0",
                         i
                                      i
                                          i
                                                i";
                            i
                              i
                                  i
                                             i
                     = "
       loadpage hi
                        0
                            1
                               0
                                   0
                                      1
                                         0
                                             0
                                                 0",
                                                x",
                      " 0
                            0 0
                                         х х
                                  x
                                       х
                      " х х х а4
                                      a3 a2 a1 a0",
                         i
                            i
                               i
                                  i
                                       i
                                          i
                                                i";
                    = " 0 1 0 0
                                   1 1 0
                                           0",
       writepage
                      " 0 0 0 0 0 a10 a9 a8",
                      " a7 a6 a5 x x x x x",
                      " x x x x x x x x";
     mode
                = 0x41;
     delay
                = 6;
     blocksize
                = 32;
               = 256;
     readsize
#
   ATtiny44 has Signature Bytes: 0x1E 0x92 0x07.
    memory "signature"
                    = 3;
       size
                    = "0 0 1 1
                                 0 0 0 0 0 0 0 x x x x x",
       read
                      "x x x x x x a1 a0
                                             0 0 0 0 0 0 0 0";
    memory "lock"
       size
                    = 1;
                    = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
       write
                      "x x x x x x x x x x x x x i i";
                    = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
                      min write delay = 9000;
      max write delay = 9000;
    memory "lfuse"
       size
                    = 1;
                    = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
       write
                      "x x x x x x x x i i i i i i i i";
                    = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0",
       read
                      "x x x x x x x x o o o o o o o o";
      min write delay = 9000;
      max_write_delay = 9000;
```

```
memory "hfuse"
        size
                      = 1;
                      = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
        write
                       "xxxx xxxx iiii iiii";
                       = "0 1 0 1 1 0 0 0 0 0 0 0 0 1 0 0 0", \\ "x x x x x x x x x x 0 0 0 0 0 0; \\
       read
      min_write_delay = 9000;
      max_write_delay = 9000;
    memory "efuse"
       size
                      = 1;
                      = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
        write
                       "x x x x x x x x x x x x x x i";
                      = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
       read
                       "x x x x x x x x 0 0 0 0 0 0 0 0";
      min write delay = 9000;
      max_write_delay = 9000;
    memory "calibration"
       size
                      = 1;
                      = "0 0 1 1 1 0 0 0 0 0 0 x x x x x x",
        read
                       "0 0 0 0 0 0 0 a0 0000 000";
 ;
#-----
# ATtiny84
#------
part
                = "t84";
    id
               = "ATtiny84";
    desc
    has_debugwire = yes;
    flash_instr = 0xB4, 0x07, 0x17;
    eeprom_instr = 0xBB, 0xFF, 0xBB, 0xEE, 0xBB, 0xCC, 0xB2, 0x0D,
                 0xBC, 0x07, 0xB4, 0x07, 0xBA, 0x0D, 0xBB, 0xBC, 0x99, 0xE1, 0xBB, 0xAC;
## no STK500 devcode in XML file, use the ATtiny45 one
  stk500_devcode = 0x14;
avr910_devcode = ?;
## Try the AT90S2313 devcode:
    avr910 devcode = 0x20;
                   = 0x1e 0x93 0x0c;
    signature
    reset
                   = io;
    chip_erase_delay = 4500;
                   = "1 0 1 0 1 1 0 0
                                      0101 0011",
    pgm enable
                     "x x x x x x x x
                                      xxxx xxxx";
    chip_erase
                   = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
                     = 200;
   timeout
   stabdelay
                 = 100;
   cmdexedelay
                       = 25:
   synchloops
                       = 32;
                 = 0;
   bytedelay
                 = 3;
   pollindex
   pollvalue
                 = 0x53;
   predelay
                 = 1;
                 = 1;
   postdelay
   pollmethod
                       = 1;
   hvsp_controlstack
       0x4C, 0x0C, 0x1C, 0x2C, 0x3C, 0x64, 0x74, 0x66,
```

```
0x68, 0x78, 0x68, 0x68, 0x7A, 0x6A, 0x68, 0x78,
    0x78, 0x7D, 0x6D, 0x0C, 0x80, 0x40, 0x20, 0x10, 0x11, 0x08, 0x04, 0x02, 0x03, 0x08, 0x04, 0x0F;
hventerstabdelay
                 = 100;
hvspcmdexedelay
                  = 0;
                  = 6;
synchcycles
latchcycles
                  = 1;
togglevtg
                  = 1;
                  = 25;
poweroffdelay
resetdelayms
                  = 0;
resetdelayus
                  = 70;
                 = 100;
= 25;
hvleavestabdelay
resetdelay
chiperasepolltimeout = 40;
chiperasetime = 0;
programfusepolltimeout = 25;
programlockpolltimeout = 25;
ocdrev
                   = 1;
memory "eeprom"
   size
                   = 512;
   paged
                   = no;
                  = 4;
   page size
    min_write_delay = 4000;
    max_write_delay = 4500;
                  = 0xff;
    readback p1
    readback_p2
                    = 0xff;
    read
                    = "1 0 1 0
                                   0 0 0 0
                                                 0 0 0 x x x x a8",
                      "a7 a6 a5 a4 a3 a2 a1 a0
                                                 0000 0000";
                    = "1 1 0 0
                                   0 0 0 0
                                                 0 0 0 x x x x a8",
    write
                      "a7 a6 a5 a4 a3 a2 a1 a0 iiii iiii";
               = "
                        1
                            0
                                0
                                      0
                                          0
                                                  1",
  loadpage lo
                    1
                                                 0",
                   0
                        0
                            0
                               0
                                      0
                                          0
                                             0
                 " 0
                      0
                            0
                               0
                                      0
                                          0 a1 a0",
                 " i
                      i
                            i
                               i
                                      i
                                         i
                                                i";
               = " 1
  writepage
                        1
                            0
                               0
                                      0
                                          0
                                              1
                                                  0",
                 " 0
                      0
                           x
                               x
                                      x
                                         x
                                              x
                                                  x",
                                     a3 a2 0
                 " x a6 a5 a4
                                                 0",
                 " x
                                            x x";
                       x
                           х
                              х
                                      x
                                         x
               = 0x41;
  mode
               = 6;
  delay
  blocksize
               = 4;
  readsize
              = 256;
 memory "flash"
    paged
                    = yes;
    size
                    = 8192;
                    = 64;
    page_size
                    = 128;
    num pages
    min_write_delay = 4500;
    max_write_delay = 4500;
    readback p1
                    = 0xff;
                    = 0xff;
    readback_p2
                    = " 0
                                         0
                                            0
                                               0
                                                     0",
    read lo
                               1
                                   0
                      " 0
                           0 0 0 all al0 a9
                                                    a8",
                      " a7
                           a6 a5
                                        a3 a2
                                                    a0",
                                   a4
                                                a1
                      11
                        0
                             0
                                0
                                    0
                                         0
                                             0
                                                     o";
    read hi
                    = " 0
                             0
                                1
                                    0
                                        1 0
                                               0
                                                     0",
                      " 0
                                               a9
                           0
                               0
                                    0
                                      a11 a10
                                                    a8",
                      " a7
                                                    a0",
                            a6 a5 a4
                                        a3 a2 a1
                      "
                                                     0";
                        0
                             0
                                0
                                    0
                                         0
                                             0
                                                0
                                                     0",
                    = " 0
    loadpage_lo
                             1
                                0
                                    0
                                         0
                                             0
                                                 0
                      11
                         0
                             0
                                0
                                                     x",
                                    x
                                         х
                                             х
                                                 х
```

```
a0",
                            x a4
                                     a3 a2 a1
                       х
                          х
                    11
                       i
                                         i
                          i
                             i
                                 i
                                     i
                                            i
                                                i";
                  = " 0
    loadpage hi
                         1
                            0
                                0
                                     1
                                        0 0 0",
                    " 0
                          0
                              0 x
                                        x x x",
                                     x
                    " x
                                     a3 a2 a1 a0",
                         х х а4
                    11
                      i
                          i
                              i
                                 i
                                     i
                                         i
                                            i
                                               i";
                  = " 0 1 0 0
                                     1 0 0",
                                 1
    writepage
                    " 0 0 0 0 all al0 a9 a8",
                    " a7 a6 a5 x x x x x",
                    " x x x x x x x x x";
              = 0x41;
  mode
  delay
             = 6;
  blocksize
           = 32;
            = 256;
  readsize
ATtiny84 has Signature Bytes: 0x1E 0x93 0x0C.
memory "signature"
   size
   read
                  = "0 0 1 1 0 0 0 0 0 0 0 x x x x x",
                    "x x x x x x a1 a0 0 0 0 0 0 0 0";
memory "lock"
   size
                  = 1;
                  = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
    write
                  "x x x x x x x x x x x x x x x x ii"; = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0",
                    min write delay = 9000;
  max write delay = 9000;
memory "lfuse"
   size
                  = 1;
    write
                  = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
                    "x x x x x x x x i i i i i i i i";
                  = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
   read
                    "x x x x x x x x 0 0 0 0 0 0 0 0";
   min write delay = 9000;
   max write delay = 9000;
memory "hfuse"
   size
                  = 1;
                  = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
    write
                    "x x x x x x x x i i i i i i i i;
                  = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
   read
                    "x x x x x x x x 0 0 0 0 0 0 0 0";
   min write delay = 9000;
   max write delay = 9000;
memory "efuse"
   size
                  = 1;
    write
                  = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
                    "x x x x x x x x x x x x x x i";
                  = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
   read
                    "x x x x x x x x 0 0 0 0 0 0 0 0";
   min write delay = 9000;
   max write delay = 9000;
memory "calibration"
   size
                  = 1;
```

```
= "0
                                                   0 0 0 x x x x x",
                             0
                               1
                                  1
                                      1
                                         0
                                            0
                                               0
        read
                                      0 0 0 a0
                         "0
                            0 0 0
                                                   0000 0000";
  ;
# ATtinv43U
#-----
part
   id
                = "t43u";
                = "ATtiny43u";
   desc
   has_debugwire = yes;
   flash instr = 0xB4, 0x07, 0x17;
   eeprom_instr = 0xBB, 0xFF, 0xBB, 0xEE, 0xBB, 0xCC, 0xB2, 0x0D,
                       0xBC, 0x07, 0xB4, 0x07, 0xBA, 0x0D, 0xBB, 0xBC,
                       0x99, 0xE1, 0xBB, 0xAC;
   stk500_devcode
                   = 0x14;
##
  avr910_devcode
                   = ?;
## Try the AT90S2313 devcode:
   avr910 devcode = 0x20;
   signature
                   = 0x1e 0x92 0x0C;
   reset
                   = io;
   chip erase_delay = 1000;
                   = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
   pgm_enable
                      "x x x x x x x x x x x x x x x x x";
                   = "1 0 1 0 1 1 0 0
                                         100x xxxx",
   chip erase
                      "x x x x x x x x x x x x x x x x";
                              = 200;
   timeout
   stabdelay
                      = 100;
   cmdexedelay
                      = 25;
                      = 32;
   synchloops
                      = 0;
   bytedelay
   pollindex
                      = 3;
   pollvalue
                      = 0x53;
   predelay
                      = 1;
   postdelay
                      = 1;
   pollmethod
                      = 1;
       pp_controlstack = 0x0E, 0x1E, 0x0E, 0x1E, 0x2E, 0x3E, 0x2E, 0x3E, 0x4E,
0x5E,
                                      0x4E, 0x5E, 0x6E, 0x7E, 0x6E, 0x7E, 0x06,
0x16, 0x46, 0x56,
                                      0x0A, 0x1A, 0x4A, 0x5A, 0x1E, 0x7C, 0x00,
0x01, 0x00, 0x00,
                                      0x00, 0x00;
   hventerstabdelay
                      = 100;
   progmodedelay
                      = 0;
   hvspcmdexedelay
                      = 0;
   latchcycles
                      = 5;
   togglevtg
                      = 1;
   poweroffdelay
                      = 20;
                      = 1;
   resetdelayms
   resetdelayus
                      = 0;
   hvleavestabdelay
                      = 15;
                      = 15;
   resetdelay
   chiperasepulsewidth = 0;
   chiperasepolltimeout = 10;
   programfusepulsewidth = 0;
   programfusepolltimeout = 5;
   programlockpulsewidth = 0;
   programlockpolltimeout = 5;
   memory "eeprom"
               size
                              = 64;
               paged
                                     = yes;
               page_size
                                     = 16;
               num_pages
               min_write_delay = 4000;
```

```
max_write_delay = 4500;
          readback_p1 = 0xff;
                         = 0xff;
          readback_p2
                         = "1 0 1 0
                                        0 0 0 0 0 000x xxxx",
          read
                           "0 0 a4 a3 a2 a1 a0 oooo ooo";
                           "1 1 0 0 0 0 0 0 0 000 x x x x x",
"0 0 a5 a4 a3 a2 a1 a0 iiii iiii;
                         = "1 1 0 0
          write
                                                          1",
                         = " 1
                                     0
                                         0
                                               0
                                                  0
                                                     0
          loadpage lo
                                 1
                                                         0",
                           11
                              0
                                 0
                                     0
                                         0
                                               0
                                                  0
                                                    0
                           "
                                                     a1 a0",
                              0
                                 0
                                     0
                                        0
                                               0
                                                  0
                              i
                                 i
                                     i
                                        i
                                              i
                                                  i
                                                      i
                                                          i";
                         = " 1
                                        0
                                                          0",
          writepage
                                    0
                                              0
                                                 0
                                                     1
                           " 0 0 x x
                                                         x",
                                              х х х
                                                         0",
                           "
                             0 0 a5 a4
                                              a3 a2 0
                           11
                             x
                                x
                                    х
                                       x
                                              x x x x";
                         = 0x41;
          mode
          delay
                        = 5;
          blocksize
                        = 4;
          readsize
                         = 256;
   ;
memory "flash"
                 = yes;
   paged
   size
                 = 4096;
               = 64;
   page size
   num_pages
                 = 64;
   min write delay = 4500;
   max write delay = 4500;
   readback p1
                = 0xff;
   readback_p2
                 = 0xff;
   read lo
                  = " 0
                          0
                             1
                                 0
                                      0
                                        0
                                             0
                                                 0",
                    " 0
                                               a8",
                         0
                            0 0
                                     0 a10 a9
                    " a7 a6 a5 a4
                                     a3 a2 a1
                                                a0",
                    11
                      0
                          0
                             0
                                                 o";
                                     0
   read hi
                  = " 0
                          0
                              1
                                 0
                                      1
                                         0
                                             0
                                                 0",
                   " 0
                                0
                                                a8",
                         0
                             0
                                      0 a10 a9
                    " a7 a6
                                     a3 a2 a1
                                               a0",
                            a5 a4
                    " 0
                                                 o";
                          0
                             0
                                 0
                                      0
                  = " 0
                              0
                                 0
                                                 0",
   loadpage lo
                          1
                                     0
                                         0
                                             0
                    "
                                                x",
                      0
                          0
                              0
                                 ж
                                         x
                                            x
                                     x
                    " x
                                     a3 a2 a1
                                                a0",
                         x
                             х а4
                    " i
                         i
                              i
                                i
                                     i
                                        i
                                            i
                                                i";
                  = "
                      0
                         1
                              0
                                 0
                                      1
                                        0
                                             0
                                                 0",
   loadpage_hi
                                                x",
                    11
                      0
                          0
                              0
                                 х
                                     x
                                         x
                                             х
                                            a1 a0",
                      x
                          x
                              x
                                a4
                                     a3 a2
                                        i
                                                i";
                      i
                          i
                                 i
                                     i
                                            i
                              i
                 = " 0 1 0 0
                                  1 1 0 0",
   writepage
                   " 0 0 0 0
" a7 a6 a5 x
                                  0 a10 a9 a8",
                                  x x x x",
x x x x";
                    " x x x x
          mode
                         = 0x41;
           delay
                         = 10;
          blocksize
                         = 64;
                         = 256;
          readsize
memory "signature"
                 = 3;
  size
                 = "0 0 1 1
                                0 0 0 0
                                                       x x x x",
   read
                                            0 0 0 x
                   "x x
                          х х
                                x x a1 a0
                                            0 0 0 0
                                                       0 0 0
                                                                0";
memory "lock"
```

```
= 1:
       size
                     = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
"x x x x x x x x 1 1 i i i i i i;";
       write
      min_write_delay = 4500;
      max write delay = 4500;
   memory "lfuse"
                    = 1;
      size
                    = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
       write
                      "x x x x x x x x i i i i i i i i;
                     = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
       read
                      "x x x x x x x x 0 0 0 0 0 0 0 0";
       min write delay = 4500;
       max write delay = 4500;
   memory "hfuse"
                    = 1;
      size
       write
                    = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
                      "x x x x x x x x i i i i i i i i;
                     = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
       read
                      "x x x x x x x x o o o o o o o o";
      min write delay = 4500;
       max write delay = 4500;
   memory "efuse"
                    = 1;
      size
                    = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
       write
                      "x x x x x x x x x x x x x x i";
                     = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
      read
                     "x x x x x x x x 0 0 0 0 0 0 0 0";
      min write delay = 4500;
      max write delay = 4500;
   memory "calibration"
                    = 2:
      size
                     = "0 0 1 1 1 0 0 0
                                               000x xxxx",
      read
                      "0 0 0 0 0 0 a0
                                               0000 0000";
;
             -----
# ATmega32u4
#-----
part
  id
                 = "m32u4";
   desc
                 = "ATmega32U4";
   signature
                = 0x1e 0x95 0x87;
   has_jtag
                 = yes;
   stk500_devcode = 0xB2;
avr910_devcode = 0x43;
   chip erase delay = 9000;
   pagel
                = 0xD7;
                  = 0xA0;
   bs2
   reset
                  = dedicated;
                 = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
   pgm_enable
                   = "1 0 1 0 1 1 0 0
                                     1000 0000",
   chip_erase
                    "x x x x x x x x x x x x x x x x";
                 = 200;
   timeout
   stabdelay
                 = 100;
```

```
= 25;
cmdexedelay
                       = 32;
synchloops
                = 0;
bytedelay
pollindex
                = 3;
                = 0x53;
pollvalue
                = 1;
predelay
postdelay
                = 1;
pollmethod
                       = 1;
pp_controlstack
    0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
    0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
hventerstabdelay = 100;
progmodedelay
                   = 0;
                    = 5;
latchcycles
togglevtg
                    = 1;
poweroffdelay
                    = 15;
                    = 1;
resetdelayms
resetdelayus
                   = 0;
hvleavestabdelay
                  = 15;
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
idr
                     = 0x31;
                     = 0x57;
spmcr
                     = 0x3b;
rampz
allowfullpagebitstream = no;
ocdrev
                     = 3;
memory "eeprom"
    paged
                    = no; /* leave this "no" */
                    = 4; /* for parallel programming */
    page_size
    size
                    = 1024;
    min write delay = 9000;
    max_write_delay = 9000;
    readback_p1
                    = 0x00;
    readback_p2
                    = 0x00;
                     = " 1
    read
                              0
                                  1
                                      0
                                             0 0
                                                     0
                                                          0",
                       " x
                             х
                                             x a10
                                                     a9
                                                         a8",
                                 x
                                      x
                       " a7 a6
                                                         a0",
                                             a3 a2
                                 a5
                                     a4
                                                     a1
                       11
                                                          o";
                         0
                              0
                                  0
                                      0
                                              0
                                                 0
                                                      0
    write
                     = " 1
                              1
                                  0
                                      0
                                              0
                                                 0
                                                      0
                                                          0",
                       11
                         х
                              х
                                  х
                                      х
                                             x a10
                                                     a9
                                                         a8",
                       " a7
                             a6
                                 a5
                                     a4
                                             a3 a2
                                                     a1
                                                         a0",
                                      i
                                                     i
                                                          i":
                         i
                              i
                                  i
                                              i
                                                 i
                = "
                                                      1",
                                  O
                                              0
                                                  0
   loadpage_lo
                    1
                          1
                              0
                                          0
                   **
                                                0
                      0
                          0
                              0
                                  0
                                          0
                                             0
                                                     0",
                   11
                     0
                          0
                              0
                                  0
                                          0
                                             a2
                                                 a1
                                                     a0",
                     i
                              i
                                             i
                                                 i
                                                     i";
                         i
                                  i
                                          i
  writepage
                 = " 1
                        1
                              0
                                  0
                                         0
                                            0 1
                                                      0",
                        0 x x a6 a5 a4
                  " 0
                                         x a10 a9 a8",
                   " a7
                                        a3
                                            0
                                                 0
                                                      0",
                                                x
                                            x
                   " x
                                                     x";
                          x
                              x
                                  x
                                         x
  mode
                = 0x41;
                = 20;
  delay
  blocksize
                = 4;
  readsize
                = 256;
```

```
memory "flash"
                = yes;
= 32768;
   paged
   size
   page size
               = 128;
                = 256;
   num pages
   min_write_delay = 4500;
   max_write_delay = 4500;
   readback_p1
                 = 0x00;
                 = 0x00;
   readback_p2
                 = " 0 0 1 0
                                     0 0 0 0",
   read lo
                  " 0 a14 a13 a12
                                    all al0 a9 a8",
                   " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                  " 0
                        0
                           0
                               0
                                     0
                                        0
                                                0";
                 = " 0 0 1
   read hi
                                0
                                     1 0
                                           0
                   " 0 a14 a13 a12
                                    all al0 a9 a8",
                   " a7 a6 a5 a4
                                               a0",
                                    a3 a2 a1
                     0
                            0
                                     0 0
                                               0";
                       0
                               0
                                           0
                                           0 0",
                 = " 0 1
                            0 0
                                     0 0
   loadpage_lo
                  " x x x x
                                     x x x x",
                   " x x a5 a4
                                     a3 a2 a1 a0",
                   " i
                       i i
                              i
                                     i i i
                                                i";
                                                0",
                 = " 0 1 0 0
                                     1
                                         0 0
   loadpage_hi
                   " x x x x
                                     х х х
                                               x",
                   " x x a5 a4
                                     a3 a2 a1
                                               a0",
                   " i
                                                i";
                        i
                            i
                               i
                                      i
                                        i
                                            i
                 = " 0
   writepage
                        1
                           0
                               0
                                     1
                                         1
                                             0
                                                0".
                  " a15 a14 a13 a12
                                     all al0 a9 a8",
                  " а7 а6 х х
                                                x",
                                     х х х
                  " x x x x
                                     х х х
                                                x";
             = 0x41;
  mode
             = 6;
  delay
 blocksize
            = 128;
  readsize
            = 256;
memory "lfuse"
                 = 1;
  size
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
   write
                  "x x x x x x x x i i i i i i i i";
                 = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
                  "x x x x x x x x 0 0 0 0 0 0 0 0";
  min_write_delay = 9000;
   max_write_delay = 9000;
memory "hfuse"
                 = 1;
  size
   write
                 = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
                  "x x x x x x x x i i i i i i i i";
                 = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
                  "x x x x x x x x 0 0 0 0 0 0 0 0";
   min write delay = 9000;
   max write delay = 9000;
memory "efuse"
                 = 1;
  size
   write
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
                  "x x x x x x x x x x x i i i i ";
                 = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
   read
                  "x x x x x x x x 0 0 0 0 0 0 0 0";
   min_write_delay = 9000;
```

```
max_write_delay = 9000;
   memory "lock"
                  = 1;
     size
                  read
                    "x x x x x x x x x x o o o o o o";
                  = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
      write
                    "xxxx xxxx 11ii iiii";
     min write delay = 9000;
     max_write_delay = 9000;
   memory "calibration"
                  = 1;
      size
                  read
   memory "signature"
    size
                  = 3;
                  = "0 0 1 1 0 0 0 0
                                         x x x x x x x x",
      read
                   "x x x x
                               x x a1 a0
                                         0 0 0 0
 ;
#-----
# AT90USB646
#-----
part
               = "usb646";
  id
  stk500 devcode = 0xB2;
   avr910_devcode = 0x43;
   chip_erase_delay = 9000;
   pagel
                = 0xD7;
   reset
                = 0xA0;
                = dedicated;
                = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
   pgm_enable
                 "x x x x x x x x x x x x x x x x";
                = "1 0 1 0 1 1 0 0
                                  1000 0000",
   chip erase
                  = 200;
   timeout
   stabdelay
              = 100;
                    = 25;
   cmdexedelay
   synchloops
                     = 32;
   bytedelay
               = 0;
   pollindex
               = 3;
   pollvalue
               = 0x53;
               = 1;
   predelay
   postdelay
               = 1;
   pollmethod
                    = 1;
   pp controlstack
      0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F, 0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
      0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
   hventerstabdelay = 100;
                 = 0;
   progmodedelay
   latchcycles
                 = 5;
= 1;
   togglevtg
                 = 15;
   poweroffdelay
   resetdelayms
                 = 1;
```

```
= 0:
resetdelayus
                = 15;
hvleavestabdelay
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
                  = 0x31;
spmcr
                  = 0x57;
                  = 0x3b;
rampz
allowfullpagebitstream = no;
ocdrev
                  = 3;
memory "eeprom"
                  = no; /* leave this "no" */
   paged
   page_size
                  = 8; /* for parallel programming */
                  = 2048;
   size
   min_write_delay = 9000;
   max_write_delay = 9000;
                  = 0x00;
   readback_p1
   readback p2
                  = 0x00;
                                                  0",
                  = " 1
                                       0 0
                          0 1
                                 0
                                              0
   read
                    " x x x x
                                       x a10 a9 a8",
                    " a7 a6 a5 a4
                                       a3 a2
                                                  a0",
                    " 0 0
                                                   o";
                              0
                                 0
                                        0 0
                  = " 1
   write
                          1
                              0
                                  0
                                        0
                                            0
                                               0
                                                   0",
                    " x
                                               a9 a8",
                                        x a10
                             x
                          х
                                 х
                    " a7 a6
                                                  a0",
                             a5 a4
                                       a3 a2
                                               a1
                      i
                          i
                              i
                                 i
                                        i
                                           i
                                               i
                                                   i";
              = "
                      1
                              0
                                        0
                                            0
                                               1",
  loadpage lo
                   1
                                              0",
                  0
                      0
                          0
                              0
                                    0
                                       0
                                           0
                " 0
                     0
                          0
                              0
                                    0 a2 a1 a0",
                " i
                     i i
                              i
                                    i
                                       i
                                          i i";
  writepage
              = " 1
                      1
                          0
                              0
                                    0
                                       0
                                           1
                                               0",
                " 0
                     0
                                    x a10 a9 a8",
                          x
                             x
                " a7 a6 a5 a4
                                   a3 0 0 0",
                " x
                                    х х
                                          x x";
                      x
                         x
                             х
              = 0x41;
  mode
              = 10;
  delay
  blocksize
              = 8;
  readsize
              = 256;
memory "flash"
   paged
                  = yes;
                 = 65536;
   size
   page size
                = 256;
                 = 256;
   num_pages
   min_write_delay = 4500;
   max write delay = 4500;
   readback_p1
                  = 0x00;
                  = 0x00;
   readback_p2
   read lo
                  = " 0
                         0 1 0
                                       0 0 0
                                                   0",
                                                  a8",
                    " 0 a14 a13 a12
                                      a11 a10 a9
                    " a7 a6 a5 a4
                                                  a0",
                                       a3 a2
                                               a1
                    " 0
                          0
                              0
                                  0
                                        0
                                           0
                                                   o";
   read hi
                  = " 0
                        0
                             1
                                  0
                                       1 0
                                              0
                                                   0",
                    " 0 a14 a13 a12
                                                  a8",
                                      a11 a10
                                              a9
                    " a7 a6 a5 a4
                                       a3 a2
                                               a1
                                                  a0",
                                                   o";
                                        0
                 = " 0 1 0 0
                                       0 0 0
                                                   0",
   loadpage lo
```

```
x",
                        x
                            х
                                x
                                      х х
a3 a2
                                             ×
                      х
                    11
                      x a6 a5 a4
                                                 a0",
                                              a1
                    " i
                         i
                            i
                                i
                                       i
                                          i
                                              i
                                                  i";
                  = " 0 1
   loadpage hi
                              0
                                 0
                                       1
                                           0
                                                   0",
                    " x x
                                      x x x
a3 a2 a1
                                                 x",
                            х
                                x
                    11
                      x a6
                            a5 a4
                                                  a0",
                      i
                          i
                             i
                                 i
                                       i
                                           i
                                              i
                                                  i";
                                                 0",
                  = " 0 1
                             0
                                 0
                                       1 1
                                             0
   writepage
                   " 0 a14 a13 a12
                                      all al0 a9 a8",
                   " a7 x x x
                                      x x x x",
                         x
                            х х
                                          х
                                                  x";
  mode
              = 0x41;
             = 6;
  delay
  blocksize
             = 256;
  readsize
              = 256;
memory "lfuse"
  size
                 = 1;
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
"x x x x x x x x i i i i i i i i;;
   write
   read
                  = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
                   "x x x x x x x x 0 0 0 0 0 0 0 0";
   min_write_delay = 9000;
  max write delay = 9000;
memory "hfuse"
  size
                 = 1;
                 = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
"x x x x x x x x i i i i i i i i;;
   write
                 = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
   read
                   "x x x x x x x x o o o o o o o o";
   min_write_delay = 9000;
   max write delay = 9000;
memory "efuse"
  size
                 = 1;
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
   write
                   "x x x x x x x x x x x x i i i i";
                  = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
   read
                   "x x x x x x x x o o o o o o o o";
   min_write_delay = 9000;
   max write delay = 9000;
memory "lock"
  size
                 = 1;
                 read
                 = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
   write
                   "x x x x x x x x x 1 1 i i i i i i i;
   min write delay = 9000;
   max write delay = 9000;
memory "calibration"
  size
                 = 1;
                 read
```

```
memory "signature"
       size
                       = 3;
                       = "0 0 1 1 0 0 0 0
       read
                                                   x x x x
                                                                x x x x",
                         "x x x x
                                     x x a1 a0
                                                  0 0 0 0 0 0 0 0";
#------
# AT90USB647
# identical to AT90USB646
part parent "usb646"
                    = "usb647";
   id
   desc
                   = "AT90USB647";
                  = 0x1e 0x96 0x82;
   signature
   ocdrev
                       = 3;
# AT90USB1286
#-----
   id = "usb1286";
desc = "AT90USB1286";
signature = 0x1e 0x97 0x82;
has_jtag = yes:
    has_jtag = yes;
stk500_devcode = 0xB2;
avr910_devcode = 0x43;
#
   chip_erase_delay = 9000;
   page1 = 0xD7;
                   = 0xA0;
   bs2
                    = dedicated;
    reset
                   = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
   pgm_enable
                     "xxxx xxxx xxxx xxxx";
                    = "1 0 1 0 1 1 0 0 1 0 0 0 0 0 0 0 0",
    chip_erase
                      "x x x x x x x x x x x x x x x x";
                   = 200;
    timeout
    stabdelay
                   = 100;
    cmdexedelay
                         = 25:
    synchloops
                          = 32;
    bytedelay
                   = 0;
   pollindex
                   = 3;
   pollvalue
                   = 0x53;
   predelay
                   = 1;
    postdelay
                   = 1;
   pollmethod
                         = 1;
   pp_controlstack
        0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
        0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
       0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
   hventerstabdelay = 100;
progmodedelay = 0;
   progmodedelay = 0,
= 5;
                     = 1;
    togglevtg
   poweroffdelay
resetdelayms
resetdelayus
                      = 15;
                      = 1;
                     = 0;
= 15;
    hvleavestabdelay
    chiperasepulsewidth = 0;
    chiperasepolltimeout = 10;
    programfusepulsewidth = 0;
   programfusepolltimeout = 5;
   programlockpulsewidth = 0;
```

```
programlockpolltimeout = 5;
                 = 0x31;
spmcr
                 = 0x57;
                 = 0x3b;
rampz
allowfullpagebitstream = no;
ocdrev
                 = 3;
memory "eeprom"
                 = no; /* leave this "no" */
  paged
                = 8; /* for parallel programming */
   page_size
                 = 4096;
   size
   min_write_delay = 9000;
   max_write_delay = 9000;
   readback p1
                = 0x00;
                 = 0x00;
   readback_p2
   read
                 = " 1
                         0
                             1
                                0
                                      0 0
                                             0
                                                 0",
                   " x
                                     a11 a10
                         x
                             x
                                x
                                             a9
                                                 a8",
                   " a7 a6 a5 a4
                                     a3 a2 a1 a0",
                   " 0
                                      0
                                                 0";
                         0
                            0
                                0
                                         0
                                             0
                 = " 1
                         1
                             0
                                0
                                      0 0
                                             0
                                                 0",
   write
                   " x
                         x
                                x
                                     a11 a10
                                             a9
                                                a8",
                            x
                   " a7 a6
                                                a0",
                                      a3 a2 a1
                            a5
                               a4
                     i
                         i
                            i
                                i
                                      i
                                         i
                                             i
                                                 i";
             = "
                         0
                             O
                                   0
                                       0
                                          0
                                              1",
  loadpage_lo
                      1
                  1
                11
                  0
                      0
                         0
                             0
                                   0
                                      0
                                          0
                                      a2 a1 a0",
                11
                  0
                      0
                         0
                             0
                                   0
                         i
                                             i";
                 i
                     i
                             i
                                   i
                                      i
                                         i
              = " 1
  writepage
                    1
                         0
                             0
                                   0 0 1
                                            0",
                    0 x x
a6 a5 a4
                " 0
                                  x a10 a9 a8",
                                  a3 0 0 0",
x x x x x";
                " a7
                            x
                " x
                     х
                        x
  mode
              = 0x41;
  delay
              = 10;
  blocksize
              = 8;
             = 256;
  readsize
memory "flash"
                 = yes;
  paged
   size
                 = 131072;
                = 256;
   page size
                = 512;
   num pages
   min_write_delay = 4500;
   max_write_delay = 4500;
               = 0x00;
   readback_p1
   readback_p2
                 = 0x00;
   read lo
                 = " 0
                        0 1 0
                                      0 0 0
                                                0",
                   "a15 a14 a13 a12
                                     all al0 a9 a8",
                   " a7 a6 a5 a4
                                    a3 a2 a1 a0",
                   " 0 0
                                                 o";
                            0 0
                                      0 0 0
                                                 0",
                 = " 0 0 1
                                      1 0 0
   read hi
                                n
                   "a15 a14 a13 a12
                                     all al0 a9 a8",
                   " a7 a6 a5 a4
                                     a3 a2
                                             a1
                                                 a0",
                   " 0 0
                                                o";
                            0 0
                                      0 0
                 = " 0
                                                 0",
                                         0
                         1
                             0
                                0
                                      0
                                             0
   loadpage_lo
                   " x
                                      x x x
                                                 x",
                            х
                               х
                        х
                   11
                     x a6 a5 a4
                                      a3 a2 a1
                                                 a0",
                                                 i";
                        i
                            i
                               i
                                      i
                                         i
                                             i
                      i
                 = " 0
                                                 0",
   loadpage_hi
                         1
                             0
                                0
                                       1
                                          0
                                             0
                   " x
                                                 x",
                                             x
                         х
                            х
                                х
                                       х
                                          х
                                                a0",
                   " x a6 a5 a4
                                      a3 a2 a1
```

```
i
                        i
                           i
                              i
                                    i
                                       i
                                           i
                                              i":
                = " 0 1 0 0
                                              0",
   writepage
                                   1 1 0
                 "a15 a14 a13 a12
                                  all al0 a9 a8",
                                  " a7 х х х
                  " x x x x
  mode
             = 0x41;
            = 6;
  delav
            = 256;
 blocksize
  readsize
            = 256;
memory "lfuse"
  size
                = 1;
   write
                = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
                 "x x x x x x x x i i i i i i i i;
                = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
   read
                 "x x x x x x x x o o o o o o o o";
  min write delay = 9000;
  max_write_delay = 9000;
memory "hfuse"
                = 1;
  size
                = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
   write
                 "x x x x x x x x i i i i i i i i ;
                = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
                 "x x x x x x x x 0 0 0 0 0 0 0 0";
  min write delay = 9000;
  max write delay = 9000;
memory "efuse"
                = 1;
  size
                = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
   write
                 "x x x x x x x x x x x i i i i";
                = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
   read
                 "x x x x x x x x 0 0 0 0 0 0 0 0";
  min write delay = 9000;
  max write delay = 9000;
memory "lock"
  size
                = 1;
                = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
   read
                 "x x x x x x x x x x o o o o o o";
                = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
   write
                 "x x x x x x x x x 1 1 i i i i i i i;
  min write delay = 9000;
  max write delay = 9000;
memory "calibration"
  size = 1;
                = "0 0 1 1 1 0 0 0 x x x x x x x x x",
   read
                 memory "signature"
  size
                = 3;
                read
                 "x x x x x x a1 a0 o o o o o o o";
 ;
```

```
#-----
# AT90USB1287
#-----
# identical to AT90USB1286
part parent "usb1286"
         id
                                                = "usb1287";
          desc
                                                    = "AT90USB1287";
                                                    = 0x1e 0x97 0x82;
          signature
          ocdrev
                                                         = 3;
# AT90USB162
 #-----
part
         id
                                                    = "usb162";
                                                 = "AT90USB162";
          desc
                                      = no;
          has jtag
         has_debugwire = yes;
signature = 0x1e 0x94 0x82;
          chip_erase_delay = 9000;
          reset
                                                    = io;
                                                    = "1 0 1 0 1 1 0 0
          pgm_enable
                                                                                                         0 1 0 1 0 0 1 1",
                                                        = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
          chip_erase
                                                         = 0 \times D7;
          pagel
                                                    = 0xC6;
          bs2
          timeout
                                                  = 200;
          stabdelay
                                                  = 100;
          cmdexedelay
                                                                   = 25;
          synchloops
                                                                   = 32;
                                                 = 0;
          bytedelay
          pollindex
                                                 = 3;
                                                 = 0x53;
          pollvalue
          predelay
                                                  = 1;
          postdelay
                                                 = 1;
          pollmethod
                                                                  = 1;
          pp_controlstack
                    0 \\  \  \, x0 \\  \  \, E \,, \  \, 0 \\  \  \, x1 \\  \  \, E \,, \  \, 0 \\  \  \, x2 \\  \  \, F \,, \  \, 0 \\  \  \, x2 \\  \  \, E \,, \  \, 0 \\  \  \, x3 \\  \  \, E \,, \  \, 0 \\  \  \, x2 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, F \,, \  \, 0 \\  \  \, x3 \\  \  \, \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \  \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ \, 1 \\  \ 
                    0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
          hventerstabdelay = 100;
          progmodedelay = 0;
          latchcycles
                                                           = 5;
          togglevtg
                                                           = 1;
          poweroffdelay
                                                           = 15;
          resetdelayms
                                                           = 1;
          resetdelayus = 0;
hvleavestabdelay = 15;
          chiperasepulsewidth = 0;
          chiperasepolltimeout = 10;
          programfusepulsewidth = 0;
          programfusepolltimeout = 5;
          programlockpulsewidth = 0;
          programlockpolltimeout = 5;
          ocdrev
                                                            = 1;
          memory "eeprom"
                                                           = no; /* leave this "no" */
                  paged
                                                           = 4; /* for parallel programming */
                    page_size
                                                            = 512;
                    size
                                                         = 128;
                    num pages
                    min_write_delay = 9000;
```

```
max_write_delay = 9000;
   readback p1 = 0x00;
readback p2 = 0x00;
               = " 1
   read
                       0 1
                            0
                                  0 0 0 0",
                 " 0 0 0 0
                                 all al0 a9 a8",
                 " a7 a6 a5 a4
                                            a0",
                                 a3 a2 a1
                 " 0
                      0
                         0
                            0
                                  0 0 0
                                            0";
                                        0 0",
                = " 1 1
                          0
                            0
                                  0 0
   write
                 " 0 0
                                 all al0 a9 a8",
                         0
                            0
                 " a7 a6 a5 a4
                                 a3 a2 a1 a0",
                 " i
                            i
                                  i i i
                                           i";
                      i
                         i
                            0 0 0
                                        1",
           = " 1 1
  loadpage_lo
                       0
                          0
                              0 0 0 0",
              " 0
                  0
                       0
                          0
              " 0
                  0
                       0
                          0
                              0 0 a1 a0",
              " i
                                     i i";
                  i i i
                               i i
            = " 1 1
                                0 0 1
                       0
                          0
  writepage
               " 0 0 0 0 all al0 a9 a8",
                " a7 a6 a5 a4
                                 a3 a2 0 0",
              " x x x x
                                x x x x";
  mode
            = 0x41;
            = 20;
  delay
  blocksize
           = 4;
  readsize = 256;
memory "flash"
              = yes;
 paged
              = 16384;
   size
             = 128;
= 128;
   page_size
   num_pages
   min_write_delay = 4500;
   max_write_delay = 4500;
   readback_p1 = 0x00;
   readback_p2
               = 0x00;
                                  0 0 0
                                           0",
                = " 0 0 1 0
   read lo
                 "a15 a14 a13 a12
                                 all al0 a9
                                            a8",
                                 a3 a2 a1
                                            a0",
                 " a7 a6 a5 a4
                 " 0
                      0
                                  0 0
                                            0";
                         0
                             0
                                        0
                = " 0 0 1 0
                                           0",
   read hi
                                  1 0 0
                 "a15 a14 a13 a12
                                 all al0 a9 a8",
                                 a3 a2
                 " a7 a6 a5 a4
                                            a0",
                                        a1
                 " 0
                                            o";
                      0
                         0
                            0
                                  0 0
                                        0
                                           0",
                = " 0 1 0 0
   loadpage_lo
                                  0 0 0
                 " x x x x
                                  x x x a a 3 a 2 a 1
                                           x",
                   x x a5 a4
                 11
                                            a0",
                 " i
                       i
                          i
                             i
                                   i
                                      i
                                         i
                                            i";
   loadpage hi
                = " 0 1
                          0
                            0
                                  1
                                      0 0
                                            0",
                 " x x x x
                                           x",
                                  x x x
                 **
                   х х а5 а4
                                  a3 a2 a1
                                            a0",
                   i
                       i
                          i
                             i
                                  i
                                     i
                                         i
                                            i";
                                           0",
               = " 0 1 0 0
   writepage
                                  1 1 0
                 "a15 a14 a13 a12
                                 all al0 a9 a8",
                 " a7 a6 x x
" x x x x
                                            x",
                                 x x x x x x
                                            x";
  mode
            = 0x41;
  delay
            = 6;
  blocksize
          = 128;
  readsize
           = 256;
memory "lfuse"
```

```
= 1:
       size
                    = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
       write
                      "xxxx xxxx iiii iiii";
                    = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
                     "x x x x x x x x 0 0 0 0 0 0 0 0";
      min write delay = 9000;
      max write delay = 9000;
   memory "hfuse"
                    = 1;
      size
                    = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
      write
                     "x x x x x x x i i i i i i i i;;
                    = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
                     "x x x x x x x x 0 0 0 0 0 0 0 0";
      min write delay = 9000;
      max_write_delay = 9000;
   memory "efuse"
      size
                    = 1;
                    = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
       write
                     "x x x x x x x x i i i i i i i i;
                    = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
                     "x x x x x x x x o o o o o o o o";
      min write delay = 9000;
      max write delay = 9000;
   memory "lock"
                    = 1;
      size
                    = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
      read
                      "x x x x x x x x x x o o o o o o";
                    = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
                     "x x x x x x x x 1 1 i i i i i i;
      min write delay = 9000;
      max write delay = 9000;
   memory "calibration"
     size
                   = 1:
                    memory "signature"
     size
                    = 3;
                    = "0 0 1 1 0 0 0 0
                                 0 0 0 0 0 0 0 0 x x x x x x",
x x a1 a0 o o o o o o o o";
      read
                     "x x x x
# AT90USB82
#-----
# Changes against AT90USB162 (beside IDs)
  memory "flash"
#
                     = 8192:
    size
#
      num pages
                     = 64;
part
   id
                = "usb82";
           = "AT90USB82";
   desc
                = no;
   has_jtag
   has_debugwire
                 = yes;
                = 0x1e 0x93 0x82;
   signature
   chip erase delay = 9000;
```

```
= io;
reset
                                                            = "1 0 1 0 1 1 0 0
                                                                                                                                            0 1 0 1 0 0 1 1",
pgm enable
                                                                                                                                            xxxx xxxx";
                                                              "x x x x x x x x
                                                            = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
chip_erase
                                                                = 0xD7;
pagel
bs2
                                                            = 0xC6;
                                                         = 200;
timeout
                                                         = 100;
stabdelay
cmdexedelay
                                                                                = 25:
synchloops
                                                                                = 32:
                                                        = 0;
bytedelay
                                                        = 3;
pollindex
pollvalue
                                                       = 0x53;
predelay
                                                        = 1;
postdelay
                                                        = 1;
pollmethod
                                                                                = 1;
pp_controlstack
              0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
              0 \\ \mathbf{x} \\ 4 \\ \mathbf{E} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{E} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ 5 \\ \mathbf{F} \,, \quad 0 \\ \mathbf{x} \\ \mathbf
              0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
                                                              = 100;
hventerstabdelay
                                                                     = 0;
progmodedelay
latchcycles
                                                                    = 5;
togglevtg
                                                                  = 1;
                                                                    = 15;
poweroffdelay
resetdelayms
                                                                     = 1;
resetdelayus
                                                                     = 0;
                                                                = 15;
hvleavestabdelay
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
ocdrev
                                                                      = 1;
memory "eeprom"
                                                                     = no; /* leave this "no" */
            paged
                                                                    = 4; /* for parallel programming */
             page_size
              size
                                                                     = 512;
              num_pages
                                                                    = 128;
              min write delay = 9000;
              max_write_delay = 9000;
              readback_p1
                                                                = 0x00;
              readback_p2
                                                                      = 0x00;
              read
                                                                       = " 1
                                                                                                      0
                                                                                                                   1
                                                                                                                                 0
                                                                                                                                                         0 0
                                                                                                                                                                                    0
                                                                                                                                                                                                     0",
                                                                             " 0
                                                                                                    0
                                                                                                                  0
                                                                                                                                0
                                                                                                                                                     a11 a10
                                                                                                                                                                                     a9
                                                                                                                                                                                                   a8",
                                                                             " a7
                                                                                                                                                                                                   a0",
                                                                                                 a6
                                                                                                                 a5
                                                                                                                               a4
                                                                                                                                                        a3 a2
                                                                                                                                                                                     a1
                                                                                                                                                                                                      0";
                                                                                      0
                                                                                                    0
                                                                                                                   0
                                                                                                                                 0
                                                                                                                                                           0
                                                                                                                                                                      0
                                                                                                                                                                                       0
                                                                       = " 1
                                                                                                                                                                                                  0",
                                                                                                                     O
                                                                                                                                   n
                                                                                                                                                         0 0
              write
                                                                                                      1
                                                                                                                                                                                    0
                                                                              " 0
                                                                                                  0
                                                                                                                 0
                                                                                                                                0
                                                                                                                                                     a11 a10
                                                                                                                                                                                 a9
                                                                                                                                                                                                 a8",
                                                                              " a7
                                                                                                   a6
                                                                                                                 a5
                                                                                                                               a4
                                                                                                                                                        a3 a2
                                                                                                                                                                                     a1
                                                                                                                                                                                                   a0",
                                                                                                                                 i
                                                                                                                                                                      i
                                                                                                                                                                                                     i";
                                                                                      i
                                                                                                     i
                                                                                                                    i
                                                                                                                                                          i
                                                                                                                                                                                    i
                                                                                                                                                                   0
          loadpage lo
                                                         = " 1
                                                                                    1
                                                                                                      0
                                                                                                                     0
                                                                                                                                             0
                                                                                                                                                       0
                                                                                                                                                                                    1",
                                                                                                                                                                                   0",
                                                                          0
                                                                                    0
                                                                                                      0
                                                                                                                     0
                                                                                                                                             0
                                                                                                                                                            0 0
                                                                **
                                                                          0
                                                                                         0
                                                                                                      0
                                                                                                                     0
                                                                                                                                             0
                                                                                                                                                            0
                                                                                                                                                                                     a0",
                                                                                                                                                                   a1
                                                                          i
                                                                                        i
                                                                                                      i
                                                                                                                     i
                                                                                                                                             i
                                                                                                                                                            i
                                                                                                                                                                           i
                                                                                                                                                                                        i";
          writepage
                                                                          1
                                                                                   1
                                                                                                       0
                                                                                                                     0
                                                                                                                                             0
                                                                                                                                                       0
                                                                                                                                                                      1
                                                                                                                                                                                         0",
                                                                             " 0 0
                                                                                                                0
                                                                                                                              0
                                                                                                                                                    a11 a10
                                                                                                                                                                                     a9 a8",
                                                                             " a7 a6
                                                                                                                 a5 a4
                                                                                                                                                        a3 a2
                                                                                                                                                                                        0
                                                                                                                                                                                                  0",
                                                                                                                                                           х
                                                                                                                                                                                        x";
                                                                                                                    х
         mode
                                                         = 0x41;
```

```
= 20:
  delay
  blocksize = 4;
readsize = 256;
memory "flash"
  paged
                = yes;
   size
                = 8192;
                = 128;
   page_size
                = 64;
  num pages
   min write delay = 4500;
   max_write_delay = 4500;
              = 0x00;
   readback_p1
                = 0x00;
   readback_p2
                 = " 0 0 1 0
                                    0 0 0 0",
   read lo
                  "a15 a14 a13 a12
                                   all al0 a9 a8",
                  " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                  " 0 0
                           0
                                    0 0 0
                                               o";
                              0
                                           0 0",
   read hi
                = " 0 0 1 0
                                    1 0
                  "a15 a14 a13 a12
                                   all al0 a9 a8",
                  " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                  " 0 0 0 0
                                    0 0 0 0";
                                              0",
                 = " 0 1 0 0
                                    0 0 0
   loadpage_lo
                                              x",
                  " x x x x
                                     х х х
                  " x x a5 a4
                                    a3 a2 a1
                                               a0",
                  " i i
                                               i";
                           i
                              i
                                    i i
                                           i
                 = " 0
   loadpage hi
                       1
                            0
                              0
                                     1
                                         0
                                           0
                                               0",
                          x
                                               x",
                  " x x
                                     x
                                        х х
                              x
                  " x x a5 a4
                                    a3 a2 a1 a0",
                  " i i
                           i
                              i
                                    i i i
                                               i";
                = " 0 1 0 0
                                     1 1
                                               0",
   writepage
                                   all al0 a9 a8",
                  "a15 a14 a13 a12
                                   x x x x x",
x x x x x";
                  " a7 a6 x x
                  " x x x x
  mode
             = 0x41;
  delay
             = 6;
             = 128;
  blocksize
            = 256;
  readsize
memory "lfuse"
                = 1;
  size
                = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
   write
                  "x x x x x x x x i i i i i i i i";
   read
                 = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0",
                  "x x x x x x x x 0 0 0 0 0 0 0 0";
  min write delay = 9000;
  max write delay = 9000;
memory "hfuse"
                = 1;
  size
                 = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0",
   write
                  "xxxx xxxx iiii iiiii";
                 = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
   read
                 "x x x x x x x x 0 0 0 0 0 0 0 0";
  min write delay = 9000;
  max write delay = 9000;
memory "efuse"
                 = 1:
  size
                = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
   write
```

```
"x x x x x x x x i i i i i i i i";
                      = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
       read
                        "x x x x x x x x 0 0 0 0 0 0 0 0";
       min write delay = 9000;
       max write delay = 9000;
   memory "lock"
                      = 1;
      size
                      = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
       read
                        "x x x x x x x x x x x o o o o o o";
                      = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
       write
                       "xxxx xxxx 11ii iiii";
       min write delay = 9000;
      max write delay = 9000;
   memory "calibration"
                     = 1;
      size
       read
                      = "0 0 1 1 1 0 0 0 0 0 x x x x x",
                       memory "signature"
     size
                      = 3;
                      = "0 0 1 1 0 0 0 0 0 0 0 x x x x x",
       read
                       "x x x x x x a1 a0 0 0 0 0 0 0 0";
  ;
             -----
# ATmega32U2
# Changes against AT90USB162 (beside IDs)
   memory "flash"
     size
                       = 32768;
       num pages
                       = 256;
    memory "eeprom"
#
#
     size
                       = 1024;
#
       num pages
                      = 256;
part
   id
                  = "m32u2";
   desc = "ATmega32U2";
has_jtag = no;
has_debugwire = yes;
signature = 0x1e 0x95 0x8a;
   chip_erase_delay = 9000;
   reset
                 = io;
                   = "1 0 1 0 1 1 0 0
   pgm_enable
                                       0101 0011",
                   "x x x x x x x x x x = "1 0 1 0 1 0 1 0 0
                                       x x x x x x x x";
1 0 0 x x x x x",
   chip_erase
                    "x x x x x x x x x x x x x x x x x ;
                   = 0xD7;
   pagel
                   = 0xC6;
   bs2
   timeout
                  = 200;
   stabdelay
                  = 100;
                  = 25;
   cmdexedelay
   synchloops
                         = 32;
   bytedelay
                  = 0;
                  = 3;
   pollindex
                  = 0x53;
   pollvalue
                  = 1;
   predelay
   postdelay
                 = 1;
                       = 1;
   pollmethod
   pp_controlstack
       0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F, 0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
       0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
```

```
0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
hventerstabdelay = 100;
progmodedelay = 0;
latchcycles
                = 5;
                = 1;
togglevtg
poweroffdelay
                = 15;
resetdelayms
                 = 1;
resetdelayus
                 = 0;
                = 15;
hvleavestabdelay
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
ocdrev
                  = 1;
memory "eeprom"
                 = no; /* leave this "no" */
   paged
                = 4; /* for parallel programming */
   page_size
   size
                = 1024;
                 = 256;
   num_pages
   min write delay = 9000;
   max_write_delay = 9000;
   readback_p1 = 0x00;
   readback_p2
                  = 0x00;
                  = " 1
                                0
                                       0 0
                                                  0",
                          0 1
                                              0
   read
                    " 0
                          0
                             0
                                 0
                                      all al0 a9
                                                  a8",
                    " a7 a6 a5 a4
                                       a3 a2
                                               a1
                                                  a0",
                    " 0
                                                   0";
                          0
                             0
                                 0
                                        0
                                           0
                                               0
                  = " 1
   write
                          1
                              0
                                0
                                       0 0
                                              0
                                                  0",
                    " 0
                                 0
                         0
                             0
                                      all al0 a9 a8",
                    " a7
                         a6
                             a5
                                a4
                                       a3 a2
                                                  a0",
                                               a1
                                                  i";
                      i
                         i
                             i
                                 i
                                       i
                                           i
                                              i
                     1
  loadpage_lo
              = " 1
                          0
                              0
                                    0
                                       0 0
                                              1",
                                       0 0 0",
0 al a0",
                   0
                     0 0
                              0
                                    0
                11
                   0
                      0
                          0
                              0
                                    0
                   i
                      i
                          i
                              i
                                    i
                                        i
                                            i
                                               i";
                   1 1
                          0
                              0
                                    0 0 1
                                               0",
  writepage
                    " 0 0
                            0 0
                                    all al0 a9 a8",
                   " a7 a6 a5 a4
                                      a3 a2
                                               0 0",
                " x
                                               x";
                      x
                         x
                             x
                                        x
              = 0x41;
  mode
  delay
              = 20;
  blocksize
              = 4;
  readsize
              = 256;
memory "flash"
  paged
                  = yes;
                 = 32768;
   size
                 = 128;
   page size
                = 256;
   num pages
   min write delay = 4500;
   max write delay = 4500;
   readback_p1
                 = 0x00;
                  = 0x00;
   readback_p2
                          0 1 0
                                                   0",
                  = " 0
                                       0 0
   read_lo
                                              0
                    "a15 a14 a13 a12
                                      all al0 a9 a8",
                    " a7 a6 a5 a4
                                      a3 a2 a1
                                                  a0",
                    " 0
                         0
                             0
                                  0
                                       0 0
                                                   o";
                  = " 0 0 1
   read hi
                                  0
                                        1
                                           0
                                               0
                                                   0",
                    "a15 a14 a13 a12
                                                  a8",
                                      a11 a10 a9
                    " a7 a6 a5 a4
                                                  a0",
                                      a3 a2
                                              a1
```

```
0
                                                  0":
                      0
                         0
                                 0
                                       0 0
                 = " 0 1 0 0
                                                 0",
                                      0 0 0
   loadpage lo
                   " x x x x
                                      x x x x",
                   " x x a5 a4
                                      a3 a2 a1 a0",
                   " i
                                                i";
                        i
                            i
                               i
                                      i
                                         i
                                             i
                 = " 0
                                                 0",
   loadpage_hi
                         1
                             0
                                0
                                       1
                                          0
                                             0
                   " x x
                                                 x",
                            x
                               x
                                       х х х
                   " x x a5 a4
                                     a3 a2 a1 a0",
                   " i
                        i
                            i
                               i
                                      i i
                                             i
                                                 i";
                 = " 0 1 0 0
                                                 0",
   writepage
                                       1 1
                                             0
                   "a15 a14 a13 a12
                                     all al0 a9 a8",
                                     x x x x", x x";
                   " a7 a6 x x
                   " x x x x
  mode
             = 0x41;
  delay
             = 6;
  blocksize = 128;
  readsize
            = 256;
memory "lfuse"
   size
                 = 1;
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
   write
                   "x x x x x x x x i i i i i i i i";
   read
                 = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
                   "x x x x x x x x 0 0 0 0 0 0 0 0";
  min write delay = 9000;
  max write delay = 9000;
memory "hfuse"
                 = 1;
   size
                 = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0",
   write
                   "xxxx xxxx iiii iiiii";
   read
                 = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
                  "x x x x x x x x 0 0 0 0 0 0 0 0";
  min write delay = 9000;
  max write delay = 9000;
memory "efuse"
                 = 1;
   size
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
   write
                   "x x x x x x x x i i i i i i i i;
   read
                 = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
                  "x x x x x x x x 0 0 0 0 0 0 0 0";
  min write delay = 9000;
  max write delay = 9000;
memory "lock"
                 = 1;
  size
                 = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
   read
                   "x x x x x x x x x x o o o o o o";
                  = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
"x x x x x x x x 1 1 i i i i i;;
                 = "1 0 1 0 1 1 0 0
   write
  min write delay = 9000;
  max write delay = 9000;
memory "calibration"
                 = 1:
  size
                 = "0 0 1 1 1 0 0 0 0 0 0 x x x x x",
   read
```

```
"0 0 0 0 0 0 0
                                              0000000";
    memory "signature"
                       = 3;
       size
                       = "0 0 1 1
                                       0 0 0 0
                                                    0 0 0 x
       read
                                                               x x x x",
                         "x x x x
                                                   0 0 0 0 0 0 0 0";
                                       x x a1 a0
                     -----
# ATmega16U2
 ______
# Changes against ATmega32U2 (beside IDs)
    memory "flash"
                        = 16384;
        size
       num pages
                        = 128;
    memory "eeprom"
                        = 512;
       size
#
        num_pages
                        = 128;
part
   id
                    = "m16u2";
                   = "ATmega16U2";
   desc
   has_jtag
                    = no;
   has_debugwire
                    = yes;
                    = 0x1e 0x94 0x89;
    signature
    chip_erase_delay = 9000;
                    = io;
    reset
                    = "1 0 1 0 1 1 0 0
   pgm enable
                                         0101 0011",
                      "x x x x x x x x
                                         x x x x x x x x x";
                    = "1 0 1 0 1 1 0 0
"x x x x x x x x x
                                          1 0 0 x x x x x",
x x x x x x x x x;
    chip erase
                    = 0 \times D7;
    pagel
    bs2
                    = 0xC6;
                   = 200;
    timeout
    stabdelay
                   = 100;
                          = 25;
    cmdexedelay
    synchloops
                          = 32;
    bytedelay
                   = 0;
   pollindex
                   = 3;
    pollvalue
                   = 0x53;
    predelay
                   = 1;
                   = 1;
    postdelay
   pollmethod
                         = 1;
   pp_controlstack
       0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F, 0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B,
        0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
   hventerstabdelay = 100;
                       = 0;
    progmodedelay
    latchcycles
                       = 5;
    togglevtg
                       = 1;
    poweroffdelay
                       = 15;
                       = 1;
    resetdelayms
    resetdelayus
                       = 0:
                      = 15;
    hvleavestabdelay
    chiperasepulsewidth = 0;
    chiperasepolltimeout = 10;
   programfusepulsewidth = 0;
   programfusepolltimeout = 5;
    programlockpulsewidth = 0;
   programlockpolltimeout = 5;
    ocdrev
                       = 1;
    memory "eeprom"
                       = no; /* leave this "no" */
       paged
                       = 4; /* for parallel programming */
       page size
                       = 512;
       size
                       = 128;
       num_pages
```

```
min_write_delay = 9000;
   max write delay = 9000;
   readback_p1 = 0x00;
   readback_p2
               = 0x00;
   read
                 = " 1
                         0 1 0
                                     0 0 0 0",
                  " 0 0 0 0
                                    a11 a10 a9
                                               a8",
                   " a7 a6
                           a5
                               a4
                                    a3 a2
                                            a1
                                               a0",
                   " 0
                         0
                            0
                                     0
                                                o";
                 = " 1
                            0
                                0
                                     0 0
                                               0",
   write
                         1
                                           0
                   " 0
                       0
                                    all al0 a9 a8",
                            0
                              0
                   " a7
                           a5
                              a4
                                               a0",
                        a6
                                    a3 a2
                                            a1
                     i
                         i
                            i
                               i
                                      i
                                         i
                            0
                                           1",
  loadpage_lo
                 1
                     1
                         0
                                  0
                                     0
                                         0
               " 0
                    0
                         0
                            0
                                  0
                                      0
                                       0
                                           0",
                 0
                    0
                         0
                                  0
                                      0 a1 a0",
                            0
               11
                    i
                        i
                            i
                                  i
                                        i
                                            i";
                                           0",
             = " 1 1
                         0
                            0
                                  0 0 1
  writepage
                  " 0 0 0 0 all al0 a9 a8",
                  " a7 a6 a5 a4
                                   a3 a2 0 0",
                                  x x x x";
                 x x x x
             = 0x41;
  mode
  delay
             = 20;
  blocksize
             = 4;
             = 256;
  readsize
memory "flash"
  paged
                = yes;
   size
                = 16384;
              = 128;
   page_size
   num pages
                = 128;
   min_write_delay = 4500;
   max_write_delay = 4500;
               = 0x00;
   readback_p1
   readback_p2
                 = 0x00;
                           1 0
   read lo
                 = " 0
                        0
                                     0 0
                                            0
                                                0",
                                    a11 a10
                  "a15 a14 a13 a12
                                               a8",
                                            a9
                                               a0",
                   " a7 a6 a5 a4
                                    a3 a2 a1
                  " 0
                                                o";
                         0
                            0
                                     0
                                        0
                                            0
                 = " 0 0
                                                0",
   read hi
                           1
                               0
                                     1 0
                                            0
                   "a15 a14 a13 a12
                                    a11 a10
                                            a9
                                               a8",
                   " a7 a6 a5 a4
                                    a3 a2 a1
                                               a0",
                   " 0
                                                o";
                        0
                           0
                               0
                                     0
                                        0
                                            0
                 = " 0
                         1
                            0
                                0
                                     0
                                         0
                                            0
                                                0",
   loadpage_lo
                                                x",
                   11
                     x
                         x
                            ж
                               ж
                                     x
                                         х
                                            ж
                                     a3 a2
                     x
                         x
                           a5 a4
                                            a1
                                               a0",
                  " i
                                                i";
                         i
                            i
                               i
                                     i
                                        i
                                            i
                                                0",
                 = " 0
                            0
                                0
                                         0
   loadpage hi
                         1
                                     1
                                            0
                                                x",
                   11
                              x
                                     х х
a3 a2
                           х
                                            х
                     x
                         х
                   "
                     x
                         x
                           a5
                               a4
                                            a1
                                               a0",
                     i
                         i
                           i
                               i
                                     i
                                        i
                                            i
                                                i";
                 = " 0 1 0
   writepage
                                0
                                     1 1
                                           0
                                                0",
                                               a8",
                  "a15 a14 a13 a12
                                    a11 a10 a9
                           х х
х х
                                    x x x x x x
                   " a7 a6
                                                x",
                  " X
                       x
                                                x";
  mode
             = 0x41;
  delay
             = 6;
  blocksize
             = 128;
  readsize
             = 256;
```

```
memory "lfuse"
      size
                    = 1;
                    = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
      write
                     "x x x x x x x x i i i i i i i i";
                    read
                     "x x x x x x x x o o o o o o o o";
      min write delay = 9000;
      max_write_delay = 9000;
   memory "hfuse"
      size
                    = 1;
                    = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
      write
                     "x x x x x x x x i i i i i i i i;
                    = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
      read
                     "x x x x x x x x o o o o o o o o";
      min_write_delay = 9000;
      max_write_delay = 9000;
   memory "efuse"
                    = 1;
      size
                    = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
      write
                     "x x x x x x x x i i i i i i i i";
                    read
                     "x x x x x x x x o o o o o o o o";
      min write delay = 9000;
      max write delay = 9000;
   memory "lock"
      size
                    = 1;
                    = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0",
      read
                     "x x x x x x x x x x o o o o o o";
                    = "1 0 1 0 1 1 0 0 1 1 1 x x x x x x",
"x x x x x x x x x 1 1 i i i i i;;
      write
      min write delay = 9000;
      max_write_delay = 9000;
   memory "calibration"
                   = 1;
      size
                    = "0 0 1 1 1 0 0 0 0 0 0 x x x x x",
      read
                     memory "signature"
      size
                    = 3;
                    = "0 0 1 1 0 0 0 0 0 0 0 x x x x x",
      read
                     "x x x x x x a1 a0 o o o o o o o";
          -----
# Changes against ATmega16U2 (beside IDs)
#
  memory "flash"
#
    size
                     = 8192;
      page_size
blocksize
                    = 64;
#
#
                   = 64;
part
                 = "m8u2";
   id
   desc
                 = "ATmega8U2";
                = no;
   has_jtag
   has_debugwire = yes;
```

```
= 0x1e 0x93 0x89;
 signature
chip_erase_delay = 9000;
reset
                                          = io;
                                          = "1 0 1 0 1 1 0 0
                                                                                              0 1 0 1 0 0 1 1",
pgm_enable
                                             = "1 0 1 0 1 1 0 0
                                                                                              100x xxxx",
chip_erase
                                               "x x x x x x x x
                                                                                               x x x x x x x x x";
                                          = 0xD7;
pagel
                                          = 0xC6;
bs2
timeout
                                        = 200;
stabdelay
                                        = 100;
                                                         = 25;
cmdexedelay
                                                         = 32;
synchloops
                                       = 0;
bytedelay
pollindex
                                       = 3;
                                       = 0x53;
pollvalue
predelay
                                        = 1;
postdelay
                                       = 1;
pollmethod
                                                         = 1;
pp_controlstack
          0 \\  \  \, x0E \, , \  \, 0 \\  \  \, x1E \, , \  \, 0 \\  \  \, x0F \, , \  \, 0 \\  \  \, x1F \, , \  \, 0 \\  \  \, x2E \, , \  \, 0 \\  \  \, x3E \, , \  \, 0 \\  \  \, x2F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \  \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x3F \, , \  \, 0 \\  \ \, x
         0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
hventerstabdelay = 100;
progmodedelay
                                                = 0;
                                                 = 5;
latchcycles
togglevtg
                                                = 1;
poweroffdelay
                                                 = 15;
                                                = 1;
resetdelayms
                                              = 0;
resetdelayus
                                             = 15;
hvleavestabdelay
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
ocdrev
                                                  = 1;
memory "eeprom"
                                                 = no; /* leave this "no" */
        paged
                                                = 4; /* for parallel programming */
          page size
                                                  = 512;
          size
                                                = 128;
          num pages
          min_write_delay = 9000;
          max_write_delay = 9000;
                                                 = 0x00;
          readback_p1
          readback_p2
                                                  = 0x00;
                                                                                                                                           0",
                                                                                                            0 0
                                                  = " 1
                                                                         0
          read
                                                                                  1
                                                                                            0
                                                                                                                                   0
                                                      " 0
                                                                        0 0 0
                                                                                                          all al0 a9 a8",
                                                       " a7 a6 a5 a4
                                                                                                          a3 a2 a1
                                                                                                                                          a0",
                                                                                                                                            0";
                                                             0
                                                                         0
                                                                                  0
                                                                                             0
                                                                                                              0 0
          write
                                                  = " 1
                                                                         1
                                                                                   0
                                                                                             0
                                                                                                             0 0
                                                                                                                                0
                                                                                                                                           0",
                                                       " 0 0
                                                                                                          all al0 a9 a8",
                                                                                0
                                                                                         0
                                                       " a7 a6
                                                                                a5 a4
                                                                                                          a3 a2 a1
                                                       " i
                                                                      i
                                                                                  i
                                                                                           i
                                                                                                             i
                                                                                                                    i
                                                                                                                               i
                                                                                                                                           i";
                                        = "
                                                                         0
                                                                                   0
                                                                                                    0
                                                                                                               0
                                                                                                                         0
                                                                                                                                  1",
       loadpage lo
                                                    1
                                                              1
                                             " 0
                                                                                                              0 0
                                                                                                                             0",
                                                              0
                                                                         0
                                                                                   0
                                                                                                    0
                                             " 0
                                                           0
                                                                         0
                                                                                   0
                                                                                                    0
                                                                                                               0 a1 a0",
                                             11
                                                              i
                                                                         i
                                                                                   i
                                                                                                               i
                                                                                                                                  i";
                                                                                                                                 0",
                                                                                   0
                                                              1
                                                                         0
                                                                                                    0
                                                                                                             0
                                                                                                                       1
      writepage
                                                  1
                                                      " 0
                                                                         0
                                                                                  0
                                                                                           0
                                                                                                         a11 a10
                                                                                                                                a9 a8",
                                                      " a7 a6
                                                                                                            a3 a2
                                                                                a5 a4
                                                                                                                                 0 0",
                                             " x
                                                                                                                                  x";
                                                             х
                                                                        х
                                                                                  х
                                                                                                    х
                                                                                                             х
                                                                                                                      x
```

```
= 0x41;
  mode
             = 20;
  delay
 blocksize
            = 4;
  readsize = 256;
memory "flash"
                = yes;
  paged
                = 8192;
   size
  page size
               = 64;
                = 128;
   num_pages
   min write delay = 4500;
   max_write_delay = 4500;
   readback_p1 = 0x00;
   readback_p2
                = 0x00;
                 = " 0 0 1 0
                                     0 0 0
                                               0",
   read lo
                  "a15 a14 a13 a12
                                    a11 a10 a9
                                               a8",
                   " a7 a6 a5 a4
                                    a3 a2 a1
                                                a0",
                   " 0
                                                o";
                        0
                           0
                                     0 0
                               0
                                            0
   read_hi
                 = " 0 0 1 0
                                     1 0 0
                                               0",
                   "a15 a14 a13 a12
                                    all al0 a9 a8",
                                   a3 a2
                   " a7 a6 a5 a4
                                            a1
                                               a0",
                   " 0
                        0
                           0
                               0
                                     0 0
                                                o";
   loadpage lo
                 = " 0 1 0 0
                                     0 0 0
                                               0",
                   " x x x x
                                               x",
                                     x x x a a 3 a 2 a 1
                     x x a5 a4
                   11
                                               a0",
                   " i
                         i
                            i
                               i
                                      i
                                         i
                                            i
                                                i";
                 = " 0 1
                            0 0
                                     1 0 0
                                                0",
   loadpage hi
                   " x x x x
                                               x",
                                     х х х
                   " x x a5 a4
                                     a3 a2 a1
                                               a0",
                   11
                         i
                            i
                               i
                                     i
                                         i
                                                i";
                 = " 0 1 0 0
   writepage
                                     1 1 0
                   "a15 a14 a13 a12
                                    all al0 a9 a8",
                   " a7 a6 x x
" x x x x
                                    x x x x x x
                                               x",
                                                x";
             = 0x41;
  mode
            = 6;
  delay
  blocksize = 64;
readsize = 256
  readsize
             = 256;
memory "lfuse"
   size
                 = 1;
   write
                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
                  "x x x x x x x x i i i i i i i i;
                 = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
   read
                  "x x x x x x x x 0 0 0 0 0 0 0 0";
   min write delay = 9000;
   max_write_delay = 9000;
memory "hfuse"
   size
                 = 1;
                 = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
   write
                  "xxxx xxxx iiii iiii";
                 = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
   read
                  "x x x x x x x x 0 0 0 0 0 0 0 0";
   min write delay = 9000;
  max_write_delay = 9000;
memory "efuse"
```

```
= 1:
                      size
                                                                 = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
                      write
                                                                      "xxxx xxxx iiii iiii";
                                                                 = "0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0",
                                                                     "x x x x x x x x 0 0 0 0 0 0 0 0";
                    min_write delay = 9000;
                      max write delay = 9000;
           memory "lock"
                                                                 = 1;
                    size
                                                                 = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0",
                      read
                                                                      "x x x x x x x x x x o o o o o o";
                      write
                                                                 = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
                                                                    "xxxx xxxx 11ii iiii";
                    min write delay = 9000;
                     max_write_delay = 9000;
           memory "calibration"
                    size
                                                               = 1;
                                                                 = "0 0 1 1 1 0 0 0
                                                                                                                          0 0 0 x x x x x",
                                                                      memory "signature"
                 size
                                                                = 3:
                                                                 = "0 0 1 1
                     read
                                                                                                             0 0 0 0
                                                                                                                                              0 0 0 x x x x x",
                                                                      "x x x x
                                                                                                            x x a1 a0
                                                                                                                                              0 0 0 0
                                             _____
# ATmega325
part
          id
                                                        = "m325";
                                               = "ATmega325";
= 0x1e 0x95 0x05;
= yes;
           desc
           signature
           has_jtag
       stk500_devcode = 0x??; # No STK500v1 support?
      avr910 devcode = 0x??; # Try the ATmega16 one
          avr910_devcode = 0x74;
          pagel
                                                        = 0xd7;
           bs2
                                                        = 0xa0;
           chip_erase_delay = 9000;
          pgm_enable
                                               = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
                                                            "0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0";
           chip_erase
                                                        = "1 0 1 0 1 1 0 0
                                                                                                                       1000 0000",
                                                             "0 0 0 0 0 0 0
                                                                                                                 0000 0000";
           timeout
                                                                = 200;
           stabdelay
                                                             = 100;
           cmdexedelay
                                                                = 25;
                                                                = 32;
           synchloops
                                                                = 0;
           bytedelay
                                                              = 3;
           pollindex
           pollvalue
                                                                = 0x53;
           predelay
                                                                = 1:
           postdelay
                                                                = 1;
           pollmethod
                                                                = 1;
           pp_controlstack
                      0 \\  \  \, x0 \\  \  \, E \,, \quad 0 \\  \  \, x1 \\  \  \, E \,, \quad 0 \\  \  \, x2 \\  \  \, F \,, \quad 0 \\  \  \, x2 \\  \  \, E \,, \quad 0 \\  \  \, x3 \\  \  \, E \,, \quad 0 \\  \  \, x2 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \  \, x3 \\  \  \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\  \ \, x3 \\  \ \, F \,, \quad 0 \\ 
                     0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F, 0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
           hventerstabdelay = 100;
```

```
= 0;
progmodedelay
                  = 5;
latchcycles
                  = 1;
togglevtg
poweroffdelay
                 = 15;
                  = 1;
resetdelayms
                 = 0;
resetdelayus
hvleavestabdelay
                 = 15;
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
idr
                   = 0x31;
                   = 0x57;
spmcr
allowfullpagebitstream = no;
ocdrev
                   = 3;
memory "eeprom"
   paged
                  = no; /* leave this "no" */
                  = 4; /* for parallel programming */
   page_size
                  = 1024;
   size
   min_write_delay = 9000;
   max_write_delay = 9000;
   readback p1
                 = 0xff;
                  = 0xff;
   readback_p2
                   = " 1
" 0
   read
                           0
                               1
                                   0
                                          0
                                             0
                                                0
                                                     0",
                                         0
                           0
                               0
                                  0
                                             0
                                                a9
                                                    a8",
                     " a7 a6
                                         a3 a2 a1
                                                    a0",
                              a5 a4
                    " 0
                                                     o";
                           0
                                         0
                               0
                                   0
                                             0
                                                 0
                   = " 1
   write
                           1
                               0
                                   0
                                         0
                                             0
                                                0
                                                     0",
                     " 0
                          0
                              0
                                   0
                                         0
                                             0
                                                a9
                                                    a8",
                     " a7
                                                    a0",
                          a6
                              a5
                                  a4
                                         a3 a2
                                                a1
                    " i
                           i
                               i
                                   i
                                         i
                                             i
                                                     i";
                   = " 1
                               0
                                   0
                                          0
                                                     1",
                                              0
                                                 0
   loadpage_lo
                           1
                     11
                       0
                           0
                               0
                                   0
                                          0
                                              0
                                                 0
                                                     0",
                     " 0
                                                    a0",
                           0
                               0
                                   0
                                          0
                                              0
                                                a1
                    " i
                           i
                                   i
                                                i
                                                     i";
                               i
                                         i
                                             i
                                                     0",
                   = " 1
   writepage
                           1
                               0
                                   Λ
                                          0
                                             0
                                                1
                                         0 0 a9
a3 a2 0
                     " 0
                          0
                                  0
                              0
                                                    a8",
                     " a7 a6 a5 a4
                                                     0",
                                         x x x
                     " x
                                                     x";
                          x
                              x
                                  х
   mode
                  = 0x41;
   delay
                  = 10;
   blocksize
                  = 4;
   readsize
                  = 256;
memory "flash"
   paged
                  = yes;
   size
                  = 32768;
                  = 128;
   page size
                  = 256;
   num pages
   min write delay = 4500;
   max_write_delay = 4500;
                  = 0xff;
   readback p1
   readback_p2
                  = 0xff;
   read lo
                   = " 0
                           0 1 0
                                         0 0
                                                0
                                                     0",
                    " 0 a14 a13 a12
                                        all al0 a9 a8",
                     " a7 a6 a5 a4
                                        a3 a2
                                                    a0",
                                                a1
                     " 0 0
                                                     0";
                              0 0
                                         0 0
                                                0
                   = " 0 0 1 0
                                                     0",
   read hi
                                         1 0
                                                0
                    " 0 a14 a13 a12
                                        all al0 a9 a8",
```

```
a0",
                 " a7 a6 a5
                           a4
                                 a3 a2 a1
                 " 0
                     0
                                 0 0
                                          0";
                        0 0
                                       0
               = " 0
   loadpage_lo
                    1
                         0
                           0
                                 0 0 0
                 " 0 0
                        0
                           0
                                 0 0 0
                                          0",
                 " a7 a6 a5 a4
                                          a0",
                                 a3 a2 a1
                  i
                     i
                        i
                           i
                                 i i i
                                          i";
                                          0",
               = " 0 1
                         0
                           0
                                 1
                                    0
                                       0
   loadpage_hi
                                 0 0 0 0",
                " 0 0 0 0
                 " a7 a6 a5 a4
                                 a3 a2 a1 a0",
                " i i i
                                i i i
                                          i";
                           i
               = " 0 1 0 0
                                 1 1 0 0",
   writepage
                " 0 a14 a13 a12
                                all al0 a9 a8",
                               a3 a2 a1 a0",
                " a7 a6 a5 a4
                " x x x x
                                x x x x";
               = 0x41;
   mode
               = 10:
   delay
  blocksize
              = 128;
   readsize
              = 256;
memory "lock"
               = 1;
  size
               = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
   read
                "x x x x x x x x x x x o o o o o o";
               = "1 0 1 0 1 1 0 0 1 1 1 0 0 0 0 0",
   write
                "0 0 0 0 0 0 0 0 1 1 i i i i i i;
  min write delay = 9000;
  max write delay = 9000;
memory "lfuse"
  size
               = 1;
               = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0",
                = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
   write
                "0 0 0 0 0 0 0 0 0 i i i i i i i i;
  min write delay = 9000;
  max write delay = 9000;
memory "hfuse"
  size
               = 1;
               = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
   read
                = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
   write
                "0 0 0 0 0 0 0 0 iiii iiii";
  min write delay = 9000;
  max write delay = 9000;
memory "efuse"
  size
               = 1;
               read
                = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
   write
               "0 0 0 0 0 0 0 0 1 1 1 1 1 i i i";
  min_write_delay = 9000;
  max write delay = 9000;
memory "signature"
```

```
size
                      = 3:
                      = "0 0 1 1
                                     0 0 0 0
                                                 0 0 0 0
                                                              0 0 0 0",
       read
                        "0 0 0 0
                                     0 0 a1 a0 o o o
                                                              0 0 0
                                                                      o";
   memory "calibration"
                      = 1;
       size
                      = "0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0",
       read
                       # ATmega645
#-----
part
   id
                   = "m645";
                   = "ATmega645";
   desc
   signature
                  = 0x1E 0x96 0x05;
   has_jtag
                  = yes;
   stk500_devcode = 0x??; # No STK500v1 support?
avr910_devcode = 0x??; # Try the ATmega16 one
avr910_devcode = 0x74;
#
   pagel
                   = 0xd7;
   bs2
                   = 0xa0;
   chip_erase_delay = 9000;
   pgm_enable = "1 0 1 0 1 1 0 0
                                         0 1 0 1 0 0 1 1",
                                         0 0 0 0 0 0 0 0";
                     "0 0 0 0 0 0 0
                   = "1 0 1 0 1 1 0 0 1 0 0 0 0 0 0",
   chip erase
                     = 200;
    timeout
                      = 100;
   stabdelay
   cmdexedelay
                     = 25;
   synchloops
                      = 32;
                      = 0;
   bytedelay
   pollindex
                      = 3;
   pollvalue
                      = 0x53;
                      = 1:
   predelay
                      = 1;
   postdelay
   pollmethod
                      = 1;
   pp controlstack
       0x0E, 0x1E, 0x0F, 0x1F, 0x2E, 0x3E, 0x2F, 0x3F,
       0x4E, 0x5E, 0x4F, 0x5F, 0x6E, 0x7E, 0x6F, 0x7F,
       0x66, 0x76, 0x67, 0x77, 0x6A, 0x7A, 0x6B, 0x7B, 0xBE, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
   hventerstabdelay = 100;
   progmodedelay = 0;
= 5;
   latchcycles
                     = 1;
   togglevtg
   poweroffdelay
                     = 15;
   resetdelayms
resetdelayus
                      = 1:
                      = 0;
                    = 15;
   hvleavestabdelay
   chiperasepulsewidth = 0;
   chiperasepolltimeout = 10;
   programfusepulsewidth = 0;
   programfusepolltimeout = 5;
   programlockpulsewidth = 0;
   programlockpolltimeout = 5;
   idr
                      = 0x31;
                      = 0x57;
   spmcr
   allowfullpagebitstream = no;
   ocdrev
                      = 3;
```

```
memory "eeprom"
               = no; /* leave this "no" */
   paged
             = 8; /* for parallel programming */
= 2048;
   page_size
   size
   min write delay = 9000;
   max_write_delay = 9000;
   readback_p1
               = 0xff;
                = 0xff;
   readback_p2
                = " 1
                                  0 0 0
                                            0",
   read
                       0
                         1 0
                 " 0 0 0 0
                                   0 a10 a9 a8",
                 " a7 a6 a5 a4
                                            a0",
                                   a3 a2 a1
                 " 0
                       0
                          0
                             0
                                   0 0
                                             0";
                = " 1 1
   write
                          0
                            0
                                   0 0
                                        0
                 " 0 0
                          0
                            0
                                   0 a10 a9 a8",
                 " a7 a6 a5 a4
                                            a0",
                                   a3 a2 a1
                   i
                      i
                          i
                             i
                                   i i i
                                            i";
                                            1",
                = " 1 1
                          0 0
                                   0 0
                                         0
   loadpage_lo
                                            0",
                 " 0
                       0
                          0 0
                                   0 0 0
                 " 0 0 0 0
                                   0 a2 a1 a0",
                 " i i
                         i i
                                             i";
                                  i i i
                = " 1 1 0 0
                                             0",
                                   0 0 1
   writepage
                                   0 a10 a9 a8",
                 " 0 0 0 0
                 " a7 a6 a5 a4
                                   a3 0 0 0",
                 " x x
                                  x x x
                                             x";
                         х х
   mode
               = 0x41;
               = 10;
   delay
   blocksize
               = 8;
   readsize
               = 256;
memory "flash"
  paged
              = yes;
   size
              = 65536;
            = 256;
   page_size
   num pages
               = 256;
   min write delay = 4500;
   max_write_delay = 4500;
   readback p1 = 0xff;
   readback_p2
               = 0xff;
                = " 0 0 1 0
                                 0 0
                                             0",
   read lo
                                         0
                 " a15 a14 a13 a12
                                   a11 a10
                                         a9
                                            a8",
                 " a7 a6 a5 a4
                                  a3 a2 a1 a0",
                 " 0
                                             o";
                       0
                          0 0
                                   0 0 0
                = " 0
                       0
                          1
                             0
                                    1 0
                                          0
                                             0",
   read hi
                 " a15 a14 a13 a12
                                   a11 a10
                                         a9
                                             a8",
                 " a7 a6 a5 a4
                                   a3 a2 a1 a0",
                                             o";
                    0
                       0
                          0
                             0
                                   0 0
                                          0
                = " 0
                                             0",
                      1
                                   0 0
                          0
                             0
                                          O
   loadpage_lo
                            0
                                   0 0 0
a3 a2 a1
                                             0",
                 11
                         0
                   0
                      0
                 "
                   a7 a6 a5 a4
                                            a0",
                 " i
                      i
                         i
                             i
                                      i
                                             i";
                                   i
                                         i
                = " 0 1
                         0
   loadpage hi
                             0
                                   1 0 0
                                            0",
                                            0",
                 " 0 0
" a7 a6
                         0
                            0
                                  0 0 0
a3 a2 a1
                         a5 a4
                                            a0",
                 " i
                       i
                          i
                              i
                                   i
                                             i";
   writepage
                = " 0 1 0 0
                                   1 1 0
                                             0",
                 " a15 a14 a13 a12
                                   all al0 a9 a8",
                 " a7 a6 a5 a4
                                  a3 a2 a1 a0",
                     0
                       0 0
                             0
                                   0 0
                                          0
                                             0";
               = 0x41;
   mode
```

```
= 10:
      delay
                = 128;
= 256;
     blocksize
      readsize
   memory "lock"
     size
                  = 1;
                  = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0",
      read
                   "x x x x x x x x x x o o o o o o";
                  = "1 0 1 0 1 1 0 0 1 1 1 0 0 0 0 0",
      write
                  "0 0 0 0 0 0 0 0 1 1 i i i i i i;
     min write delay = 9000;
     max write delay = 9000;
   memory "lfuse"
                  = 1;
     size
                  = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0",
      read
                   write
                  "0 0 0 0 0 0 0 0 iiii iii";
     min write delay = 9000;
     max_write_delay = 9000;
   memory "hfuse"
      size
                  = 1;
                  = "0 1 0 1 1 0 0 0 0 0 0 0 1 0 0 0",
      read
                   = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
"0 0 0 0 0 0 0 0 iiii iiiii;
      write
     min write delay = 9000;
     max write delay = 9000;
   memory "efuse"
     size
                  = 1;
                  = "0 1 0 1 0 0 0 0 0 0 0 1 0 0 0",
      read
                   = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
      write
                   "0 0 0 0 0 0 0 0 1 1 1 1 1 i i i";
     min_write_delay = 9000;
     max write delay = 9000;
   memory "signature"
     size
                  = 3;
                  = "0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0",
      read
                   "0 0 0 0 0 0 a1 a0 0 0 0 0 0 0";
   memory "calibration"
                  = 1;
     size
                  = "0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0",
      read
                   #-----
# ATmega3250
part parent "m325"
              = "m3250";
   id
```

```
= 3;
   ocdrev
#-----
# ATmega6450
#------
part parent "m645"
  id = "m6450";
desc = "ATmega6450";
signature = 0x1E 0x96 0x06;
  id
  ocdrev
                  = 3;
# AVR XMEGA family common values
part
  id = ".xmega";
desc = "AVR XMEGA family common values";
has_pdi = yes;
  id
   nvm base = 0x01c0;
   mcu base = 0x0090;
   memory "signature"
    size = 3;
offset
                    = 0x1000090;
   memory "prodsig"
     size = 0x32;

offset = 0x8e0200;

page_size = 0x32;

readsize = 0x32;
   memory "fuse1"
     size = 1;
offset = 0x8f0021;
   memory "fuse2"
    size = 1;
offset = 0x8f0022;
   memory "fuse4"
    size = 1;
offset
                    = 0x8f0024;
   = 0x8f0025;
   memory "data"
      # SRAM, only used to supply the offset
                = 0 \times 10000000;
      offset
```

```
#-----
# ATxmega16A4U
part parent ".xmega"
   id = "x16a4u";
desc = "ATxmega16A4U";
    signature = 0x1e 0x94 0x41;
    memory "eeprom"
       size = 0x400;
offset = 0x8c0000;
       page_size = 0x20;
readsize = 0x100;
    memory "application"
     size = 0x4000;
offset = 0
                         = 0x800000;
       page_size = 0x100;
readsize = 0x100;
    memory "apptable"
       size = 0x1000;

offset = 0x803000;

page_size = 0x100;

readsize = 0x100;
    memory "boot"
      size = 0x1000;

offset = 0x804000;

page_size = 0x100;

readsize = 0x100;
    memory "flash"
       size = 0x5000;
offset = 0x800000;
       page_size = 0 \times 100;
       readsize = 0x100;
    memory "usersig"
      size = 0x100;

offset = 0x8e0400;

page_size = 0x100;
       readsize = 0x100;
    ______
# ATxmega16C4
part parent "x16a4u"
   id = "x16c4";
desc = "ATxmega16C4";
    signature = 0x1e 0x95 0x44;
#-----
# ATxmega16D4
part parent "x16a4u"
   id = "x16d4";
```

```
= "ATxmega16D4";
    desc
    signature = 0x1e 0x94 0x42;
#-----
# ATxmega16A4
part parent "x16a4u"
  id = "x16a4";
desc = "ATxmega16A4";
   signature = 0x1e 0x94 0x41;
   has_jtag = yes;
    memory "fuse0"
      size = 1;
offset
                         = 0x8f0020;
;
# ATxmega32A4U
#-----
part parent ".xmega"
   id = "x32a4u";
desc = "ATxmega32A4U";
    signature = 0x1e 0x95 0x41;
    memory "eeprom"
     size = 0x400;
offset =
                     = 0x8c0000;
       page_size = 0x20;
readsize = 0x100;
    memory "application"
       size = 0x8000;

offset = 0x800000;

page_size = 0x100;

readsize = 0x100;
    memory "apptable"
      size = 0x1000;
offset = 0x807000;
       page_size = 0x100;
       readsize = 0x100;
    memory "boot"
       size = 0x1000;
offset = 0x808000;
       page size = 0x100;
       readsize = 0x100;
    memory "flash"
       size = 0x9000;

offset = 0

page_size = 0x100;

readsize = 0x100;
                     = 0x800000;
    memory "usersig"
      size = 0x100; offset =
       offset
                         = 0x8e0400;
       page_size = 0x100;
readsize = 0x100;
```

```
#-----
# ATxmega32C4
part parent "x32a4u"
  id = "x32c4";
desc = "ATxmega32C4";
   signature = 0x1e 0x94 0x43;
# ATxmega32D4
part parent "x32a4u"
  id = "x32d4";
desc = "ATxmega32D4";
   signature = 0x1e 0x95 0x42;
#-----
# ATxmega32A4
#------
part parent "x32a4u"
  id = "x32a4";
desc = "ATxmega32A4";
   signature = 0x1e 0x95 0x41;
   has_jtag = yes;
   memory "fuse0"
      size = 1;
offset = 0x8f0020;
;
# ATxmega64A4U
#-----
part parent ".xmega"
  id = "x64a4u";
desc = "ATxmega64A4U";
   signature = 0x1e 0x96 0x46;
   memory "eeprom"
      size = 0x800;

offset = 0x8c0000;

page_size = 0x20;

readsize = 0x100;
   memory "application"
      size = 0x10000;
offset = 0x800000;
      page_size = 0x100;
      readsize = 0 \times 100;
   memory "apptable"
      size = 0x1000;
offset = 0
                  = 0x80f000;
      page_size = 0x100;
      readsize = 0x100;
   memory "boot"
     size = 0x1000;
```

```
= 0x810000;
      offset
      page_size = 0x100;
readsize = 0x100;
   memory "flash"
     size = 0 \times 11000;
offset = 0 \times 11000
                     = 0x800000;
      page_size = 0x100;
readsize = 0x100;
   memory "usersig"
      size = 0x100;

offset = 0x8e0400;

page_size = 0x100;

readsize = 0x100;
;
# ATxmega64C3
#-----
part parent "x64a4u"
  id = "x64c3";
desc = "ATxmega64C3";
   signature = 0x1e 0x96 0x49;
#-----
# ATxmega64D3
#-----
part parent "x64a4u"
  id = "x64d3";
desc = "ATxmega64D3";
   signature = 0x1e 0x96 0x4a;
#-----
# ATxmega64D4
#-----
part parent "x64a4u"
  id = "x64d4";
desc = "ATxmega64D4";
   signature = 0x1e 0x96 0x47;
# ATxmega64A1
part parent "x64a4u"
   id = "x64a1";
desc = "ATxmega64A1";
   signature = 0x1e 0x96 0x4e;
   has_jtag = yes;
   memory "fuse0"
     size = 1;
                     = 0x8f0020;
      offset
;
# ATxmega64A1U
```

```
part parent "x64a1"
  id = "x64a1u";
desc = "ATxmega64A1U";
   signature = 0x1e 0x96 0x4e;
#-----
# ATxmega64A3
part parent "x64a1"
  id = "x64a3";
desc = "ATxmega64A3";
   signature = 0x1e 0x96 0x42;
# ATxmega64A3U
#-----
part parent "x64a1"
  id = "x64a3u";
desc = "ATxmega64A3U";
   signature = 0x1e 0x96 0x42;
#-----
# ATxmega64A4
part parent "x64a1"
  id = "x64a4";
desc = "ATxmega64A4";
   signature = 0x1e 0x96 0x46;
;
# ATxmega64B1
part parent "x64a1"
  id = "x64b1";
desc = "ATxmega64B1";
   signature = 0x1e 0x96 0x52;
#-----
# ATxmega64B3
#-----
part parent "x64a1"
  id = "x64b3";
desc = "ATxmega64B3";
   signature = 0x1e 0x96 0x51;
# ATxmega128C3
part parent ".xmega"
   id = "x128c3";
desc = "ATxmega128C3";
   signature = 0x1e 0x97 0x52;
   memory "eeprom"
      size = 0x800;
offset = 0x8c0000;
      page_size = 0x20;
      readsize = 0 \times 100;
```

```
memory "application"
      size = 0x20000;
offset = 0x800000;
       page_size = 0x200;
       readsize = 0x100;
   memory "apptable"
     size = 0x2000;

offset = 0x81e000;

page_size = 0x200;

readsize = 0x100;
   memory "boot"
     size = 0x2000;
offset = 0
                   = 0x820000;
       page_size = 0x200;
       readsize = 0 \times 100;
   memory "flash"
      size = 0x22000;

offset = 0x800000;

page_size = 0x200;
       readsize = 0x100;
   memory "usersig"
      size = 0x200;
offset = 0x8e0400;
      page_size = 0x200;
readsize = 0x100;
;
# ATxmega128D3
#-----
part parent "x128c3"
  id = "x128d3";
desc = "ATxmega128D3";
   signature = 0x1e 0x97 0x48;
#-----
# ATxmega128D4
part parent "x128c3"
  id = "x128d4";
desc = "ATxmega128D4";
   signature = 0x1e 0x97 0x47;
;
# ATxmega128A1
#-----
part parent "x128c3"
  id = "x128a1";
desc = "ATxmega128A1";
   signature = 0x1e 0x97 0x4c;
   has_jtag = yes;
   memory "fuse0"
      size
                 = 1;
```

```
= 0x8f0020:
      offset
#-----
# ATxmega128A1 revision D
part parent "x128a1"
  id = "x128a1d";
desc = "ATxmega128A1revD";
   signature = 0x1e 0x97 0x41;
;
# ATxmega128A1U
#-----
part parent "x128a1"
 id = "x128a1u";
desc = "ATxmega128A1U";
   signature = 0x1e 0x97 0x4c;
#------
# ATxmega128A3
#-----
part parent "x128a1"
  id = "x128a3";
desc = "ATxmega128A3";
   signature = 0x1e 0x97 0x42;
# ATxmega128A3U
part parent "x128a1"
  id = "x128a3u";
desc = "ATxmega128A3U";
   signature = 0x1e 0x97 0x42;
# ATxmega128A4
#-----
part parent ".xmega"
  id = "x128a4";
desc = "ATxmega128A4";
   signature = 0x1e 0x97 0x46;
   has_jtag = yes;
   memory "eeprom"
     size = 0x800;
offset = 0x8c0000;
      page size = 0x20;
      readsize = 0x100;
   memory "application"
     size = 0x20000;
offset = 0x
                    = 0x800000;
     page_size = 0x200;
     readsize = 0x100;
   memory "apptable"
     size = 0x1000;
```

```
= 0x81f000;
         offset
        page_size = 0x200;
readsize = 0x100;
    memory "boot"
      size = 0x2000;
offset = 0
                        = 0x820000;
        page_size = 0x200;
readsize = 0x100;
    memory "flash"
        size = 0x22000;

offset = 0x800000;

page_size = 0x200;
        readsize = 0 \times 100;
    memory "usersig"
       size = 0x200;

offset = 0x8e0400;

page_size = 0x200;

readsize = 0x100;
    memory "fuse0"
      size = 1;
= 0x8f0020;
;
     ------
# ATxmega128A4U
part parent ".xmega"
    id = "x128a4u";
desc = "ATxmega128A4U";
    signature = 0x1e 0x97 0x46;
    memory "eeprom"
       size = 0x800;

offset = 0x8c0000;

page_size = 0x20;

readsize = 0x100;
    memory "application"
     size = 0x20000;

offset = 0x

page_size = 0x100;

readsize = 0x100;
                        = 0x800000;
    memory "apptable"
        size = 0x1000;
offset = 0
                        = 0x81f000;
        page size = 0 \times 100;
        readsize = 0 \times 100;
    page_size = 0x100;
        readsize = 0x100;
    memory "flash"
```

```
size = 0x22000;

offset = 0x800000;

page_size = 0x100;

readsize = 0x100;
    memory "usersig"
       size = 0x100;
offset = 0x8e0400;
       page_size = 0x100;
        readsize = 0x100;
;
# ATxmega128B1
#-----
part parent ".xmega"
  id = "x128b1";
desc = "ATxmega128B1";
    signature = 0x1e 0x97 0x4d;
    has_jtag = yes;
    memory "eeprom"
      size = 0x800;

offset = 0x8c0000;

page_size = 0x20;

readsize = 0x100;
    memory "application"
     size = 0x20000;
offset = 0x800000;
       page_size = 0x100;
readsize = 0x100;
    memory "apptable"
       size = 0x2000; offset = 0x2000
                       = 0x81e000;
        page_size = 0x100;
readsize = 0x100;
    readsize = 0x100;
    memory "flash"
       size = 0x22000;
offset = 0x800000;
       page_size = 0x100;
readsize = 0x100;
    memory "usersig"
      size = 0x100;
offset = 0x8e0400;
        page_size = 0x100;
readsize = 0x100;
    memory "fuse0"
       size = 1;
= 0x8f0020;
```

```
#-----
# ATxmega128B3
part parent "x128b1"
   id = "x128b3";
desc = "ATxmega128B3";
    signature = 0x1e 0x97 0x4b;
# ATxmega192C3
part parent ".xmega"
   id = "x192c3";
desc = "ATxmega192C3";
    signature = 0x1e 0x97 0x51;
    memory "eeprom"
      size = 0x800;

offset = 0x8c0000;

page_size = 0x20;

readsize = 0x100;
    memory "application"
       size = 0 \times 30000;
offset = 0 \times 30000
                      = 0x800000;
       page size = 0x200;
       readsize = 0x100;
    memory "apptable"
       size = 0x2000;

offset = 0

page_size = 0x200;

readsize = 0x100;
                     = 0x82e000;
    memory "boot"

size = 0x2000;

offset = 0

page_size = 0x200;

readsize = 0x100;
                      = 0x830000;
    = 0x800000;
       page_size = 0x200;
readsize = 0x100;
    memory "usersig"
       size = 0x200;
offset = 0x8e0400;
       page_size = 0x200;
        readsize = 0 \times 100;
#-----
# ATxmega192D3
part parent "x192c3"
    id = "x192d3";
```

```
= "ATxmega192D3";
   signature = 0x1e 0x97 0x49;
#-----
# ATxmega192A1
part parent "x192c3"
  id = "x192a1";
desc = "ATxmega192A1";
  signature = 0x1e 0x97 0x4e;
  has_jtag = yes;
   memory "fuse0"
     size = 1;
offset
                   = 0x8f0020;
;
# ATxmega192A3
#-----
part parent "x192a1"
  id = "x192a3";
desc = "ATxmega192A3";
   signature = 0x1e 0x97 0x44;
#-----
# ATxmega192A3U
#-----
part parent "x192a1"
  id = "x192a3u";
desc = "ATxmega192A3U";
   signature = 0x1e 0x97 0x44;
#-----
# ATxmega256C3
#-----
part parent ".xmega"
  id = "x256c3";
desc = "ATxmega256C3";
   signature = 0x1e 0x98 0x46;
   memory "eeprom"
     size = 0x1000;
offset = 0x8c0000;
      page_size = 0x20;
     readsize = 0x100;
   memory "application"
     size = 0x40000;
offset = 0x800000;
     page size = 0x200;
     readsize = 0 \times 100;
   memory "apptable"
     size = 0x2000;
offset = 0x83e000;
     page_size = 0x200;
readsize = 0x100;
```

```
memory "boot"
     size = 0x2000;
offset = 0x840000;
      page_size = 0x200;
      readsize = 0 \times 100;
   memory "flash"
     size = 0x42000;
      offset
                    = 0x800000;
     page_size = 0x200;
      readsize = 0 \times 100;
   memory "usersig"
     -----
# ATxmega256D3
#-----
part parent "x256c3"
  id = "x256d3";
desc = "ATxmega256D3";
   signature = 0x1e 0x98 0x44;
            _____
# ATxmega256A1
part parent "x256c3"
  id = "x256a1";
desc = "ATxmega256A1";
   signature = 0x1e 0x98 0x46;
   has_jtag = yes;
   memory "fuse0"
    emory "fuseo
size = 1;
= 0x8f0020;
# ATxmega256A3
part parent "x256a1"
  id = "x256a3";
desc = "ATxmega256A3";
   signature = 0x1e 0x98 0x42;
;
# ATxmega256A3U
#-----
part parent "x256a1"
  id = "x256a3u";
desc = "ATxmega256A3U";
   signature = 0x1e 0x98 0x42;
# ATxmega256A3B
```

```
#-----
part parent "x256a1"
  id = "x256a3b";
desc = "ATxmega256A3B";
    signature = 0x1e 0x98 0x43;
# ATxmega256A3BU
#-----
part parent "x256a1"
   id = "x256a3bu";
desc = "ATxmega256A3BU";
    signature = 0x1e 0x98 0x43;
# ATxmega384C3
part parent ".xmega"
   id = "x384c3";
desc = "ATxmega384C3";
   signature = 0x1e 0x98 0x45;
    memory "eeprom"
      size = 0 \times 1000;
offset = 0
                     = 0x8c0000;
       page_size = 0x20;
readsize = 0x100;
    memory "application"
       size = 0x60000;
offset = 0x800000;
       page_size = 0x200;
       readsize = 0x100;
    memory "apptable"
      size = 0x2000;

offset = 0x85e000;

page_size = 0x200;

readsize = 0x100;
    memory "boot"
     size = 0x2000;

offset = 0

page_size = 0x200;

readsize = 0x100;
                     = 0x860000;
    memory "flash"
       size = 0x62000;
offset = 0x
                     = 0x800000;
       page size = 0x200;
       readsize = 0 \times 100;
    memory "usersig"
       size = 0x200;
offset =
                         = 0x8e0400;
       page_size = 0x200;
       readsize = 0x100;
;
```

```
#-----
# ATxmega384D3
#-----
part parent "x384c3"
  id = "x384d3";
desc = "ATxmega384D3";
   signature = 0x1e 0x98 0x47;
#-----
# ATxmega8E5
part parent ".xmega"
   id = "x8e5";
desc = "ATxmega8E5";
   id
   signature = 0x1e 0x93 0x41;
   memory "eeprom"
      size = 0x0200;
offset = 0x08c0000;
      page_size = 0x20;
readsize = 0x100;
   memory "application"
      size = 0x2000;

offset = 0x0800000;

page_size = 0x80;

readsize = 0x100;
   memory "apptable"
      size = 0x800;
offset = 0x00801800;
       page_size = 0x80;
       readsize = 0x100;
   memory "boot"
      size = 0x800;
offset =
                   = 0 \times 00804000;
      page_size = 0x80;
       readsize = 0x100;
   memory "flash"
      size = 0x2800;

offset = 0x0800000;

page_size = 0x80;

readsize = 0x100;
   memory "usersig"
      size = 0x80;

offset = 0x8e0400;

page_size = 0x80;

readsize = 0x100;
;
# ATxmega16E5
#-----
part parent ".xmega"
   id = "x16e5";
desc = "ATxmega16E5";
   signature = 0x1e 0x94 0x45;
```

```
memory "eeprom"
        size = 0x0200;

offset = 0x08c0000;

page_size = 0x20;
        readsize = 0x100;
    memory "application"
       size = 0x4000;
offset = 0x0800000;
       page_size = 0x80;
readsize = 0x100;
    memory "apptable"
       size = 0x1000;
offset = 0x00803000;
        page_size = 0x80;
readsize = 0x100;
    memory "flash"
      size = 0x5000;
offset = 0x0800000;
        page_size = 0x80;
readsize = 0x100;
    memory "usersig"
size = 0x80;
offset = 0x8e0400;
page_size = 0x80;
readsize = 0x100;
# ATxmega32E5
#-----
part parent ".xmega"
   id = "x32e5";
desc = "ATxmega32E5";
    signature = 0x1e 0x95 0x4c;
    memory "eeprom"
      size = 0 \times 0400;
offset = 0
                             = 0x08c0000;
        page_size = 0x20;
readsize = 0x100;
    memory "application"
        size = 0x8000;
offset = 0
page_size = 0x80;
                         = 0 \times 08000000;
        readsize = 0 \times 100;
    memory "apptable"
        size = 0 \times 1000;
offset = 0 \times 1000
                             = 0 \times 00807000;
```

```
= 0x80;
        page size
        readsize = 0x100;
    memory "boot"
       size = 0x1000;

offset = 0

page_size = 0x80;

readsize = 0x100;
                   = 0 \times 00804000;
    memory "flash"
       size = 0x9000;
offset = 0x0800000;
       page_size = 0x80;
       readsize = 0 \times 100;
    memory "usersig"
      size = 0x80;

offset = 0x8e0400;

page_size = 0x80;

readsize = 0x100;
# AVR32UC3A0512
part
   id = "uc3a0512";
desc = "AT32UC3A0512";
    signature = 0xED 0xC0 0x3F;
    has_jtag = yes;
    is \overline{avr32} = yes;
       memory "flash"
      paged
;
part parent "uc3a0512"
   id = "ucr2";
desc = "deprecated, use 'uc3a0512'";
#-----
# ATtiny1634.
#-----
part
                   = "t1634";
           = "ATtiny1634";
    has debugwire = yes;
    flash_instr = 0xB6, 0x01, 0x11;
eeprom_instr = 0xBD, 0xF2, 0xBD, 0xE1, 0xBB, 0xCF, 0xB4, 0x00,
0xBE, 0x01, 0xB6, 0x01, 0xBC, 0x00, 0xBB, 0xBF,
                0x99, 0xF9, 0xBB, 0xAF;
    stk500 devcode = 0x86;
    # avr910 devcode = 0x;
    signature = 0x1e 0x94 0x12;
    pagel
                   = 0xB3;
                   = 0xB1;
    bs2
    reset = io;
```

```
chip_erase_delay = 9000;
            = "1 0 1 0 1 1 0 0 0 1 0 1 0 0 1 1",
pgm enable
                   "x x x x x x x x x x x x x x x ";
                 = "1 0 1 0 1 1 0 0 1 0 0 x x x x x",
chip erase
                   "x x x x x x x x x x x x x x x ";
 timeout
                = 200;
stabdelay
                = 100;
cmdexedelay
               = 25;
synchloops
                = 32;
                = 0;
bytedelay
                = 3;
pollindex
                = 0x53;
pollvalue
predelay
               = 1;
postdelay
               = 1;
pollmethod
                = 1;
pp_controlstack
    0x0E, 0x1E, 0x0E, 0x1E, 0x2E, 0x3E, 0x2E, 0x3E,
    {\tt 0x4E}\,,\ {\tt 0x5E}\,,\ {\tt 0x4E}\,,\ {\tt 0x5E}\,,\ {\tt 0x6E}\,,\ {\tt 0x7E}\,,\ {\tt 0x6E}\,,\ {\tt 0x7E}\,,
    0x26, 0x36, 0x66, 0x76, 0x2A, 0x3A, 0x6A, 0x7A,
    0x2E, 0xFD, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
                  = 100;
hventerstabdelay
                   = 0;
progmodedelay
latchcycles
                   = 0;
                   = 1;
togglevtg
                  = 15;
poweroffdelay
resetdelayms
                   = 1;
resetdelayus
                    = 0;
                  = 15;
= 15;
hvleavestabdelay
resetdelay
chiperasepulsewidth = 0;
chiperasepolltimeout = 10;
programfusepulsewidth = 0;
programfusepolltimeout = 5;
programlockpulsewidth = 0;
programlockpolltimeout = 5;
memory "eeprom"
    paged
                    = no;
                    = 4:
    page_size
                   = 256;
    size
    min write delay = 3600;
    max write delay = 3600;
                  = 0xff;
    readback p1
                    = 0xff;
    readback p2
                    = " 1 0 1 0 0 0 0 0",
    read
                      " 0 0 0 x x x x a8",
                      " a7 a6 a5 a4 a3 a2 a1 a0",
                      " 0 0 0 0 0 0 0 0";
                    = " 1 1 0 0 0 0 0 0",
    write
                      " 0 0 0 x x x x a8",
                      " a7 a6 a5 a4 a3 a2 a1 a0",
                      " i i i i i i i";
                                        0 0
            = " 1
                    1
                          0 0
                                    O
                                                1",
loadpage_lo
       <u>"</u> 0 0 0 0
                             0 0 0 0",
       " 0 0 0
                                 0 a1 a0",
                      0
                             0
          i
                  i
                      i
                            i
                                         i";
             i
                                 i
                                    i
          = " 1
                    1 0
                                   0 0 1
                            0
writepage
       " 0 0 ж ж
                            х х х а8",
       " a7 a6 a5 a4
                           a3 a2 0 0",
       " x
             х х х
                            x x x x";
mode
         = 0x41;
          = 5;
delay
blocksize = 4;
```

```
readsize = 256;
    ;
memory "flash"
                   = yes;
    paged
                   = 16384;
    size
                = 32;
= 512;
    page size
    num pages
    min_write_delay = 4500;
    max_write_delay = 4500;
                  = 0xff;
    readback_p1
                    = 0xff;
    readback_p2
    read lo
                    = " 0 0 1 0 0 0 0 0",
                      " 0 0 0 a12 a11 a10 a9 a8",
                      " a7 a6 a5 a4 a3 a2 a1 a0",
                      " 0 0 0 0 0 0 0 0";
    read hi
                     = " 0 0 1 0 1 0 0 0",
                       " 0 0 0 a12 a11 a10 a9 a8",
                        " a7 a6 a5 a4 a3 a2 a1 a0",
                        " 0 0 0 0 0 0 0 0";
                    = " 0 1 0 0 0 0 0 0",
    loadpage_lo
                      " 0 0 0 x x x x x",
                      " x x a5 a4 a3 a2 a1 a0",
                      " i i i i i i i i";
                    = " 0 1 0 0 1 0 0 0",
    loadpage_hi
                      " 0 0 0 x x x x x",
                      " x x a5 a4 a3 a2 a1 a0",
                      " i i i i i i i";
                    = " 0 1 0 0 1 1 0 0",
    writepage
                      " 0 0 0 a12 a11 a10 a9 a8",
                      " a7 a6 x x x x x x",
                      " x x x x x x x x";
    mode
                = 0x41;
    delay
                = 6;
    blocksize = 128;
                = 256;
    readsize
memory "lfuse"
    size
                    = 1;
    min_write_delay = 4500;
    max_write_delay = 4500;
                    = "0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0",
    read
                      "x x x x x x x x o o o o o o o o";
    write
                    = "1 0 1 0 1 1 0 0 1 0 1 0 0 0 0 0",
                      "x x x x x x x x i i i i i i i i";
memory "hfuse"
    size
                    = 1;
    min write delay = 4500;
    max_write_delay = 4500;
                    = "0 1 0 1 1 0 0 0 0 0 0 1 0 0 0",
    read
                      "x x x x x x x x x o o o o o o o o";
                    = "1 0 1 0 1 1 0 0 1 0 1 0 1 0 0 0",
    write
                      "x x x x x x x x i i i i i i i i";
memory "efuse"
    size
    min_write_delay = 4500;
    max write delay = 4500;
```

```
= "0 1 0 1 0 0 0 0 0 0 0 1 0 0 0",
       read
                        "x x x x x x x x x x x o o o o o";
                      = "1 0 1 0 1 1 0 0 1 0 1 0 0 1 0 0",
       write
                       "x x x x x x x x x x i i i i i";
   memory "lock"
                      = 1;
      size
       min write delay = 4500;
       max_write_delay = 4500;
                      = "0 1 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0",
       read
                        "x x x x x x x x x x x x x x o o";
                    = "1 0 1 0 1 1 0 0 1 1 1 x x x x x",
       write
                        "x x x x x x x x 1 1 1 1 1 1 i i";
   memory "calibration"
                    = 1;
      size
       read
                      = "0 0 1 1 1 0 0 0 0 0 0 x x x x x x",
                       memory "signature"
      size
                      = 3;
                      = "0 0 1 1 0 0 0 0 0 0 0 x x x x x",
       read
                       "x x x x x x a1 a0 o o o o o o o o";
       ;
;
\# Common values for reduced core tinys (4/5/9/10/20/40)
part
   id = ".reduced_core_tiny";
desc = "Common values for reduced core tinys";
   has_tpi = yes;
   memory "signature"
      size = 3;
offset
                        = 0x3fc0;
      page_size = 16;
   memory "fuse"
     size = 1;
offset
page_size = 16;
                        = 0x3f40;
      blocksize
                  = 4;
   memory "calibration"
     size = 1;
offset
      offset
                        = 0x3f80;
      page size = 16;
   memory "lockbits"
     size = 1;
       offset
                        = 0x3f00;
       page size = 16;
# ATtiny4
```

```
part parent ".reduced core tiny"
  id = "t4";
desc = "ATtiny4";
   signature = 0x1e 0x8f 0x0a;
   memory "flash"
     size = 512;
offset
                     = 0x4000;
      page_size = 16;
     blocksize = 128;
# ATtiny5
#-----
part parent "t4"
  id = "t5";
desc = "ATtiny5";
   signature = 0x1e 0x8f 0x09;
# ATtiny9
part parent ".reduced_core_tiny"
  id = "t9";
desc = "ATtiny9";
   signature = 0x1e 0x90 0x08;
   memory "flash"
     size = 1024;
offset =
                    = 0x4000;
      page_size = 16;
     blocksize = 128;
#-----
# ATtiny10
#-----
part parent "t9"
  id = "t10";
desc = "ATtiny10";
   signature = 0x1e 0x90 0x03;
# ATtiny20
part parent ".reduced core_tiny"
  id = "t20";
desc = "ATting
            = "ATtiny20";
   signature = 0x1e 0x91 0x0F;
   memory "flash"
                 = 2048;
    size
                 = 0x4000;
= 16;
     offset
      page_size
     blocksize
                 = 128;
#-----
# ATtiny40
```

```
part parent ".reduced core tiny"
   id = "t40";
desc = "ATtiny40";
    signature = 0x1e 0x92 0x0E;
    memory "flash"
               = 4096;
        size
                          = 0x4000;
        offset
        page_size = 64;
        blocksize = 128;
;
#-----
                           = "m406";
   id
    desc
                           = "ATMEGA406";
    has_jtag
                           = yes;
                           = 0x1e 0x95 0x07;
    signature
    # STK500 parameters (parallel programming IO lines)
    pagel
                           = 0xa7;
    bs2
                                  = 0xa0;
    serial
                           = no:
    parallel
                           = yes;
    # STK500v2 HV programming parameters, from XML
    pp_controlstack
                           = 0x0e, 0x1e, 0x0f, 0x1f, 0x2e, 0x3e, 0x2f, 0x3f,
                             0x4e, 0x5e, 0x4f, 0x5f, 0x6e, 0x7e, 0x6f, 0x7f, 0x66, 0x76, 0x67, 0x77, 0x6a, 0x7a, 0x6b, 0x7b, 0xbe, 0xfd, 0x00, 0x01, 0x00, 0x00, 0x00, 0x00;
    # JTAG ICE mkII parameters, also from XML files
    allowfullpagebitstream = no;
    enablepageprogramming = yes;
                                  = 0x51;
                           = 0x00;
    rampz
                           = 0x57;
    spmcr
                           = 0x3f;
    eecr
    memory "eeprom"
       paged = no;
= 512;
       page_size = 4;
       blocksize = 4;
      readsize = 4;
num_pages = 128;
    memory "flash"
     paged = yes;
                    = 40960;
       size
       page size = 128;
      blocksize = 128;
readsize = 128;
       num pages = 320;
    memory "hfuse"
                       = 1;
       size
    memory "lfuse"
       size
                        = 1;
```