```
/* $Id: io.h 2211 2011-02-14 14:04:25Z aboyapati $ */

/** \file */
/** \defgroup avr_io <avr/io.h>: AVR device-specific IO definitions
    \code #include <avr/io.h> \endcode

    This header file includes the apropriate IO definitions for the
    device that has been specified by the <tt>-mmcu=</tt> compiler
    command-line switch.  This is done by diverting to the appropriate
    file <tt>&lt;avr/io</tt><em>XXXX</em><tt>.h&gt;</tt> which should
    never be included directly.  Some register names common to all
    AVR devices are defined directly within <tt>&lt;avr/common.h&gt;</tt>
      ,
    which is included in <tt>&lt;avr/io.h&gt;</tt>,
    but most of the details come from the respective include file.

    Note that this file always includes the following files:
    \code
```

```
    #include <avr/sfr_defs.h>
    #include <avr/portpins.h>
    #include <avr/common.h>
    #include <avr/version.h>
    \endcode
    See \ref avr_sfr for more details about that header file.

    Included are definitions of the IO register set and their
    respective bit values as specified in the Atmel documentation.
    Note that inconsistencies in naming conventions,
    so even identical functions sometimes get different names on
    different devices.

    Also included are the specific names useable for interrupt
    function definitions as documented
    \ref avr_signames "here".

    Finally, the following macros are defined:

    - \b RAMEND
    <br>
    The last on-chip RAM address.
    <br>
    - \b XRAMEND
    <br>
    The last possible RAM location that is addressable. This is equal to
    RAMEND for devices that do not allow for external RAM. For devices
    that allow external RAM, this will be larger than RAMEND.
    <br>
    - \b E2END
    <br>
    The last EEPROM address.
    <br>
    - \b FLASHEND
    <br>
    The last byte address in the Flash program space.
    <br>
    - \b SPM_PAGESIZE
    <br>
    For devices with bootloader support, the flash pagesize
    (in bytes) to be used for the \c SPM instruction.
    - \b E2PAGESIZE
    <br>
    The size of the EEPROM page.

*/

#ifndef _AVR_IO_H_
#define _AVR_IO_H_

#include <avr/sfr_defs.h>

#if defined (__AVR_AT94K__)
#  include <avr/ioat94k.h>
#elif defined (__AVR_AT43USB320__)
#  include <avr/io43u32x.h>
#elif defined (__AVR_AT43USB355__)
```

```
#   include <avr/io43u35x.h>
#elif defined (__AVR_AT76C711__)
#   include <avr/io76c711.h>
#elif defined (__AVR_AT86RF401__)
#   include <avr/io86r401.h>
#elif defined (__AVR_AT90PWM1__)
#   include <avr/io90pwm1.h>
#elif defined (__AVR_AT90PWM2__)
#   include <avr/io90pwmx.h>
#elif defined (__AVR_AT90PWM2B__)
#   include <avr/io90pwm2b.h>
#elif defined (__AVR_AT90PWM3__)
#   include <avr/io90pwmx.h>
#elif defined (__AVR_AT90PWM3B__)
#   include <avr/io90pwm3b.h>
#elif defined (__AVR_AT90PWM216__)
#   include <avr/io90pwm216.h>
#elif defined (__AVR_AT90PWM316__)
#   include <avr/io90pwm316.h>
#elif defined (__AVR_AT90PWM81__)
#   include <avr/io90pwm81.h>
#elif defined (__AVR_ATmega8U2__)
#   include <avr/iom8u2.h>
#elif defined (__AVR_ATmega16M1__)
#   include <avr/iom16m1.h>
#elif defined (__AVR_ATmega16U2__)
#   include <avr/iom16u2.h>
#elif defined (__AVR_ATmega16U4__)
#   include <avr/iom16u4.h>
#elif defined (__AVR_ATmega32C1__)
#   include <avr/iom32c1.h>
#elif defined (__AVR_ATmega32M1__)
#   include <avr/iom32m1.h>
#elif defined (__AVR_ATmega32U2__)
#   include <avr/iom32u2.h>
#elif defined (__AVR_ATmega32U4__)
#   include <avr/iom32u4.h>
#elif defined (__AVR_ATmega32U6__)
#   include <avr/iom32u6.h>
#elif defined (__AVR_ATmega64C1__)
#   include <avr/iom64c1.h>
#elif defined (__AVR_ATmega64M1__)
#   include <avr/iom64m1.h>
#elif defined (__AVR_ATmega128__)
#   include <avr/iom128.h>
#elif defined (__AVR_ATmega1280__)
#   include <avr/iom1280.h>
#elif defined (__AVR_ATmega1281__)
#   include <avr/iom1281.h>
#elif defined (__AVR_ATmega1284P__)
#   include <avr/iom1284p.h>
#elif defined (__AVR_ATmega128RFA1__)
#   include <avr/iom128rfa1.h>
#elif defined (__AVR_ATmega2560__)
#   include <avr/iom2560.h>
#elif defined (__AVR_ATmega2561__)
#   include <avr/iom2561.h>
```

```
#elif defined (__AVR_AT90CAN32__)
#   include <avr/iocan32.h>
#elif defined (__AVR_AT90CAN64__)
#   include <avr/iocan64.h>
#elif defined (__AVR_AT90CAN128__)
#   include <avr/iocan128.h>
#elif defined (__AVR_AT90USB82__)
#   include <avr/iousb82.h>
#elif defined (__AVR_AT90USB162__)
#   include <avr/iousb162.h>
#elif defined (__AVR_AT90USB646__)
#   include <avr/iousb646.h>
#elif defined (__AVR_AT90USB647__)
#   include <avr/iousb647.h>
#elif defined (__AVR_AT90USB1286__)
#   include <avr/iousb1286.h>
#elif defined (__AVR_AT90USB1287__)
#   include <avr/iousb1287.h>
#elif defined (__AVR_ATmega64__)
#   include <avr/iom64.h>
#elif defined (__AVR_ATmega640__)
#   include <avr/iom640.h>
#elif defined (__AVR_ATmega644__) || defined (__AVR_ATmega644A__)
#   include <avr/iom644.h>
#elif defined (__AVR_ATmega644P__)
#   include <avr/iom644p.h>
#elif defined (__AVR_ATmega644PA__)
#   include <avr/iom644pa.h>
#elif defined (__AVR_ATmega645__) || defined (__AVR_ATmega645A__) ||
    defined (__AVR_ATmega645P__)
#   include <avr/iom645.h>
#elif defined (__AVR_ATmega6450__) || defined (__AVR_ATmega6450A__) ||
    defined (__AVR_ATmega6450P__)
#   include <avr/iom6450.h>
#elif defined (__AVR_ATmega649__) || defined (__AVR_ATmega649A__)
#   include <avr/iom649.h>
#elif defined (__AVR_ATmega6490__) || defined (__AVR_ATmega6490A__) ||
    defined (__AVR_ATmega6490P__)
#   include <avr/iom6490.h>
#elif defined (__AVR_ATmega649P__)
#   include <avr/iom649p.h>
#elif defined (__AVR_ATmega64HVE__)
#   include <avr/iom64hve.h>
#elif defined (__AVR_ATmega103__)
#   include <avr/iom103.h>
#elif defined (__AVR_ATmega32__)
#   include <avr/iom32.h>
#elif defined (__AVR_ATmega323__)
#   include <avr/iom323.h>
#elif defined (__AVR_ATmega324P__) || defined (__AVR_ATmega324A__)
#   include <avr/iom324.h>
#elif defined (__AVR_ATmega324PA__)
#   include <avr/iom324pa.h>
#elif defined (__AVR_ATmega325__) || defined (__AVR_ATmega325A__)
#   include <avr/iom325.h>
#elif defined (__AVR_ATmega325P__)
#   include <avr/iom325.h>
```

```
#elif defined (__AVR_ATmega3250__) || defined (__AVR_ATmega3250A__)
#   include <avr/iom3250.h>
#elif defined (__AVR_ATmega3250P__)
#   include <avr/iom3250.h>
#elif defined (__AVR_ATmega328P__) || defined (__AVR_ATmega328__)
#   include <avr/iom328p.h>
#elif defined (__AVR_ATmega329__) || defined (__AVR_ATmega329A__)
#   include <avr/iom329.h>
#elif defined (__AVR_ATmega329P__) || defined (__AVR_ATmega329PA__)
#   include <avr/iom329.h>
#elif defined (__AVR_ATmega3290__) || defined (__AVR_ATmega3290A__)
#   include <avr/iom3290.h>
#elif defined (__AVR_ATmega3290P__)
#   include <avr/iom3290.h>
#elif defined (__AVR_ATmega32HVB__)
#   include <avr/iom32hvb.h>
#elif defined (__AVR_ATmega32HVBREVB__)
#   include <avr/iom32hvbrevb.h>
#elif defined (__AVR_ATmega406__)
#   include <avr/iom406.h>
#elif defined (__AVR_ATmega16__)
#   include <avr/iom16.h>
#elif defined (__AVR_ATmega16A__)
#   include <avr/iom16a.h>
#elif defined (__AVR_ATmega161__)
#   include <avr/iom161.h>
#elif defined (__AVR_ATmega162__)
#   include <avr/iom162.h>
#elif defined (__AVR_ATmega163__)
#   include <avr/iom163.h>
#elif defined (__AVR_ATmega164P__) || defined (__AVR_ATmega164A__)
#   include <avr/iom164.h>
#elif defined (__AVR_ATmega165__) || defined (__AVR_ATmega165A__)
#   include <avr/iom165.h>
#elif defined (__AVR_ATmega165P__)
#   include <avr/iom165p.h>
#elif defined (__AVR_ATmega168__) || defined (__AVR_ATmega168A__)
#   include <avr/iom168.h>
#elif defined (__AVR_ATmega168P__)
#   include <avr/iom168p.h>
#elif defined (__AVR_ATmega169__) || defined (__AVR_ATmega169A__)
#   include <avr/iom169.h>
#elif defined (__AVR_ATmega169P__)
#   include <avr/iom169p.h>
#elif defined (__AVR_ATmega169PA__)
#   include <avr/iom169pa.h>
#elif defined (__AVR_ATmega8HVA__)
#   include <avr/iom8hva.h>
#elif defined (__AVR_ATmega16HVA__)
#   include <avr/iom16hva.h>
#elif defined (__AVR_ATmega16HVA2__)
#   include <avr/iom16hva2.h>
#elif defined (__AVR_ATmega16HVB__)
#   include <avr/iom16hvb.h>
#elif defined (__AVR_ATmega16HVBREVB__)
#   include <avr/iom16hvbrevb.h>
#elif defined (__AVR_ATmega8__)
```

```
#   include <avr/iom8.h>
#elif defined (__AVR_ATmega48__) || defined (__AVR_ATmega48A__)
#   include <avr/iom48.h>
#elif defined (__AVR_ATmega48P__)
#   include <avr/iom48p.h>
#elif defined (__AVR_ATmega88__) || defined (__AVR_ATmega88A__)
#   include <avr/iom88.h>
#elif defined (__AVR_ATmega88P__)
#   include <avr/iom88p.h>
#elif defined (__AVR_ATmega88PA__)
#   include <avr/iom88pa.h>
#elif defined (__AVR_ATmega8515__)
#   include <avr/iom8515.h>
#elif defined (__AVR_ATmega8535__)
#   include <avr/iom8535.h>
#elif defined (__AVR_AT90S8535__)
#   include <avr/io8535.h>
#elif defined (__AVR_AT90C8534__)
#   include <avr/io8534.h>
#elif defined (__AVR_AT90S8515__)
#   include <avr/io8515.h>
#elif defined (__AVR_AT90S4434__)
#   include <avr/io4434.h>
#elif defined (__AVR_AT90S4433__)
#   include <avr/io4433.h>
#elif defined (__AVR_AT90S4414__)
#   include <avr/io4414.h>
#elif defined (__AVR_ATtiny22__)
#   include <avr/iotn22.h>
#elif defined (__AVR_ATtiny26__)
#   include <avr/iotn26.h>
#elif defined (__AVR_AT90S2343__)
#   include <avr/io2343.h>
#elif defined (__AVR_AT90S2333__)
#   include <avr/io2333.h>
#elif defined (__AVR_AT90S2323__)
#   include <avr/io2323.h>
#elif defined (__AVR_AT90S2313__)
#   include <avr/io2313.h>
#elif defined (__AVR_ATtiny4__)
#   include <avr/iotn4.h>
#elif defined (__AVR_ATtiny5__)
#   include <avr/iotn5.h>
#elif defined (__AVR_ATtiny9__)
#   include <avr/iotn9.h>
#elif defined (__AVR_ATtiny10__)
#   include <avr/iotn10.h>
#elif defined (__AVR_ATtiny20__)
#   include <avr/iotn20.h>
#elif defined (__AVR_ATtiny40__)
#   include <avr/iotn40.h>
#elif defined (__AVR_ATtiny2313__)
#   include <avr/iotn2313.h>
#elif defined (__AVR_ATtiny2313A__)
#   include <avr/iotn2313a.h>
#elif defined (__AVR_ATtiny13__)
#   include <avr/iotn13.h>
```

```
#elif defined (__AVR_ATtiny13A__)
#  include <avr/iotn13a.h>
#elif defined (__AVR_ATtiny25__)
#  include <avr/iotn25.h>
#elif defined (__AVR_ATtiny4313__)
#  include <avr/iotn4313.h>
#elif defined (__AVR_ATtiny45__)
#  include <avr/iotn45.h>
#elif defined (__AVR_ATtiny85__)
#  include <avr/iotn85.h>
#elif defined (__AVR_ATtiny24__)
#  include <avr/iotn24.h>
#elif defined (__AVR_ATtiny24A__)
#  include <avr/iotn24a.h>
#elif defined (__AVR_ATtiny44__)
#  include <avr/iotn44.h>
#elif defined (__AVR_ATtiny44A__)
#  include <avr/iotn44a.h>
#elif defined (__AVR_ATtiny84__)
#  include <avr/iotn84.h>
#elif defined (__AVR_ATtiny84A__)
#  include <avr/iotn84a.h>
#elif defined (__AVR_ATtiny261__)
#  include <avr/iotn261.h>
#elif defined (__AVR_ATtiny261A__)
#  include <avr/iotn261a.h>
#elif defined (__AVR_ATtiny461__)
#  include <avr/iotn461.h>
#elif defined (__AVR_ATtiny461A__)
#  include <avr/iotn461a.h>
#elif defined (__AVR_ATtiny861__)
#  include <avr/iotn861.h>
#elif defined (__AVR_ATtiny861A__)
#  include <avr/iotn861a.h>
#elif defined (__AVR_ATtiny43U__)
#  include <avr/iotn43u.h>
#elif defined (__AVR_ATtiny48__)
#  include <avr/iotn48.h>
#elif defined (__AVR_ATtiny88__)
#  include <avr/iotn88.h>
#elif defined (__AVR_ATtiny87__)
#  include <avr/iotn87.h>
#elif defined (__AVR_ATtiny167__)
#  include <avr/iotn167.h>
#elif defined (__AVR_AT90SCR100__)
#  include <avr/io90scr100.h>
#elif defined (__AVR_ATxmega16A4__)
#  include <avr/iox16a4.h>
#elif defined (__AVR_ATxmega16D4__)
#  include <avr/iox16d4.h>
#elif defined (__AVR_ATxmega32A4__)
#  include <avr/iox32a4.h>
#elif defined (__AVR_ATxmega32D4__)
#  include <avr/iox32d4.h>
#elif defined (__AVR_ATxmega64A1__)
#  include <avr/iox64a1.h>
#elif defined (__AVR_ATxmega64A1U__)
```

```
#   include <avr/iox64a1u.h>
#elif defined (__AVR_ATxmega64A3__)
#   include <avr/iox64a3.h>
#elif defined (__AVR_ATxmega64D3__)
#   include <avr/iox64d3.h>
#elif defined (__AVR_ATxmega128A1__)
#   include <avr/iox128a1.h>
#elif defined (__AVR_ATxmega128A1U__)
#   include <avr/iox128a1u.h>
#elif defined (__AVR_ATxmega128A3__)
#   include <avr/iox128a3.h>
#elif defined (__AVR_ATxmega128D3__)
#   include <avr/iox128d3.h>
#elif defined (__AVR_ATxmega192A3__)
#   include <avr/iox192a3.h>
#elif defined (__AVR_ATxmega192D3__)
#   include <avr/iox192d3.h>
#elif defined (__AVR_ATxmega256A3__)
#   include <avr/iox256a3.h>
#elif defined (__AVR_ATxmega256A3B__)
#   include <avr/iox256a3b.h>
#elif defined (__AVR_ATxmega256D3__)
#   include <avr/iox256d3.h>
#elif defined (__AVR_ATA6289__)
#   include <avr/ioa6289.h>
/* avr1: the following only supported for assembler programs */
#elif defined (__AVR_ATtiny28__)
#   include <avr/iotn28.h>
#elif defined (__AVR_AT90S1200__)
#   include <avr/io1200.h>
#elif defined (__AVR_ATtiny15__)
#   include <avr/iotn15.h>
#elif defined (__AVR_ATtiny12__)
#   include <avr/iotn12.h>
#elif defined (__AVR_ATtiny11__)
#   include <avr/iotn11.h>
#elif defined (__AVR_M3000__)
#   include <avr/iom3000.h>
#else
#   if !defined(__COMPILING_AVR_LIBC__)
#     warning "device type not defined"
#   endif
#endif

#include <avr/portpins.h>

#include <avr/common.h>

#include <avr/version.h>

/* Include fuse.h after individual IO header files. */
#include <avr/fuse.h>

/* Include lock.h after individual IO header files. */
#include <avr/lock.h>

#endif /* _AVR_IO_H_ */
```