AVRminiV3.1 Manual

…a work in progress

1. AVRminiV3.1 Overview

The AVRminiV3.1 board is a low-cost versatile development board for Atmel AVR processors. The AVRminiV3.1 supports all AVR processors in 40-pin and 64-pin packages except the Atmega169. This means that the AVRmini board can be used to experiment with and develop hardware and code for more than 20 different AVR processors (about 65% of the total AVR product line).

The AVRmini board offers enough built-in debugging hardware and configuration jumpers to make it useful for development, yet it is simple and small enough to use as an application board within many products or devices.

The AVRmini is highly compatible with Atmel's own AVR development board, the STK500. I/O port header and ISP header pinouts are the same between the AVRmini and the STK500.

2. AVRminiV3.1 Features and Specifications

2.1. Standard Features:

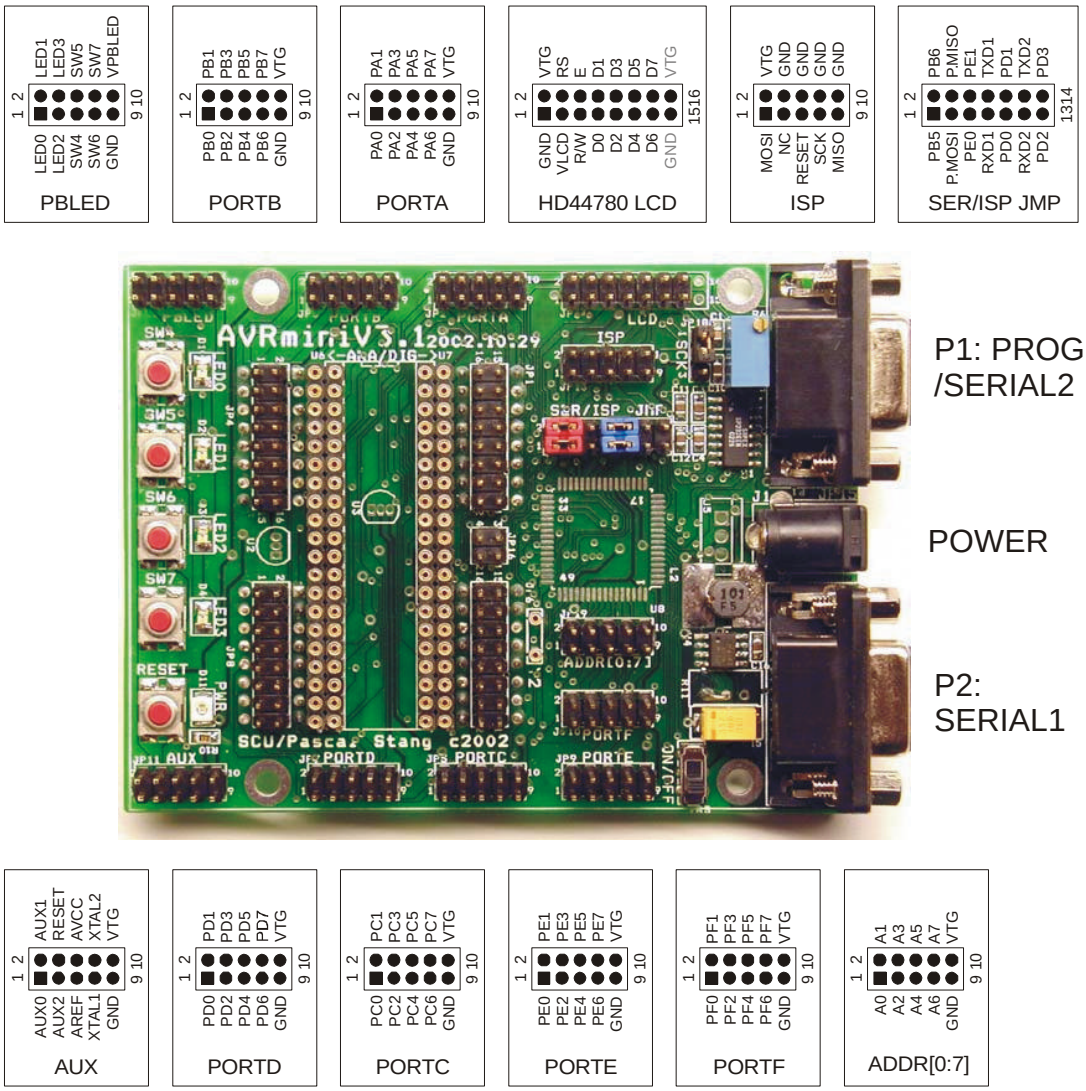
- **Socket for digital-pinout 40-pin AVR processors** (AT90S8515, Atmega161, etc)
- **Socket for analog-pinout 40-pin AVR processors** (Atmega163, Atmega16, etc)
- **Solder pads for 64-QFP AVR processors** (Atmega128, Atmega64, Atmega103)
- **Switching 5V power supply** (5V 0.5A max output, up to 25VDC input, 90% efficient)
- **AVR ports A,B,C,D,E,F available through 10-pin headers**
  (Port headers match pin-out used by STK500)
- **AVR ports A,B,C,D protected by 100O series resistors**
- **Bypass/testing headers for port A,B,C,D series resistors**
- **Header for HD44780-type character LCDs** (with on-board contrast adjust, -8V to 5V)
- **ISP header** (connects to STK500 or AVRISP for programming)
- **CPU crystal** (standard HC49U crystal socket or surface-mount crystal)
- **Two configurable DB-9 serial port connectors**
  (one DB-9 may be used as a PonyProg-style programming interface)
- **4 user pushbuttons + 4 user LEDs**
- **Reset Pushbutton**
- **Power LED and Power Switch**
- **Power jack for Wall-brick AC adapter**
- **Board Size 3"x4"**

2.2. Optional Features:

- Up to 512KByte external SRAM memory and 74HC573 address latch
- Real-time clock crystal (32.768KHz)
- Bridge rectifier on power input
    - Advantage: allows board to use any AC adaptor brick 7V-30V regardless of connector polarity
    - Disadvantage: input voltage must be at least 7V instead of 5V
- Screw-terminal power input (instead of AC adapter style power jack)

3. Board Reference

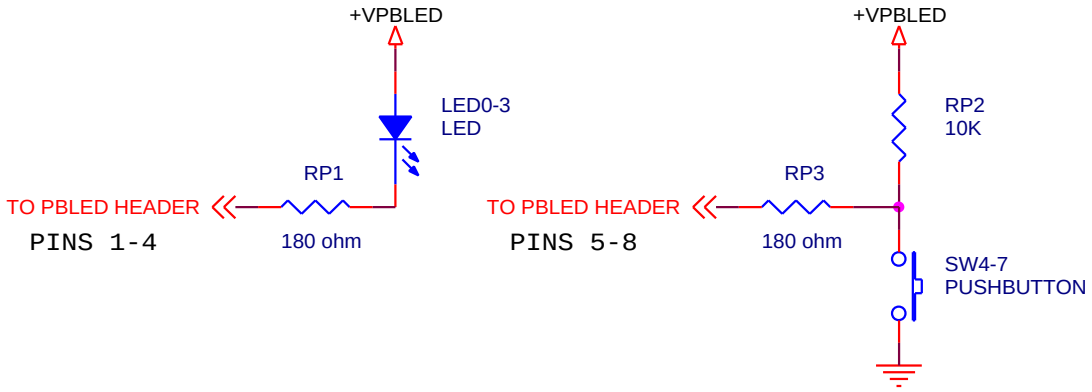
3.1. Connectors



3.2. LED and Pushbutton Circuits

The figure below shows how the four LEDs and pushbuttons on the AVRmini are connected. Both the LEDs and pushbuttons are active-low. Sending a logic low (0V) output to pins 1-4 of the PBLED header will cause LED0-3 to light, respectively. Pressing pushbuttons 4-7 will cause a logic low (0V) to be generated on pins 5-8 of the PBLED header, respectively.

Note that the power and ground for the LED and pushbutton circuit is separate from the power and ground used by the rest of the AVRmini board. The LEDs and pushbuttons will not work unless power is applied to pins 9 and 10 of the PBLED header.



4. Configuring the AVRminiV3.1

There are a number of configurable settings on the AVRminiV3.1 board. This section describes how these settings are made and shows some examples.

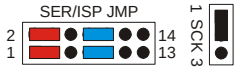
4.1. Setting the Serial/ISP and SCK Jumpers (SER/ISP JMP & SCK)

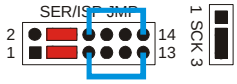
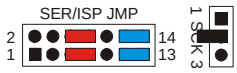
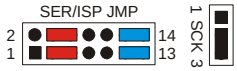
The Serial/ISP and SCK headers allow the user to configure how the AVR processor is connected to the following connectors:

- ISP (In-system Programming) Connector
- P1 – the Programming/Serial Port #2 Connector
- P2 – the Serial Port #1 Connector

Since different AVR processors use different pins for serial port I/O and programming, the jumpers on the SER/ISP and SCK headers must be set correctly for the type of processor being used, and for the way the user intends to use it.

NOTE: Incorrect jumper placement should not cause damage to the AVRmini board or the AVR processor, but may make programming of the processor or use of the serial ports impossible.

Example SER/ISP and SCK Jumper Settings	
	**40-pin AVR Processors** (incl. Atmega163, mega323, mega16, mega32, AT90S8515, AT90S8535, etc) This setting makes the following connections:

	• ISP Connector enabled for programming via STK500 • P1 connected for programming via PonyProg, UISP, etc. • P2 connected to AVR processor's UART (serial port)
	**64-pin AVR processors** (incl. Atmega128, mega64, mega103) This setting makes the following connections: • ISP Connector enabled for programming via STK500 • P1 connected for programming via PonyProg, UISP, etc. • P2 connected to AVR processor's UART1 (2nd serial port) • **AVR processor's UART0 not accessible Note: This configuration requires the use of a 2-pin jumper cable like those provided with the STK500.
	**64-pin AVR processors** (incl. Atmega128, mega64, mega103) This setting makes the following connections: • ISP Connector ususable • P1 connected to AVR processor's UART1 (2nd serial port) • P2 connected to AVR processor's UART0 (1st serial port) • **Programming port not accessible Note: Because this configuration offers two serial ports at the expense of no programming port, it is recommended that a bootloader program be used on the processor to allow programming through one of the serial ports.
	**64-pin AVR processors** (incl. Atmega128, mega64, mega103) This setting makes the following connections: • ISP Connector enabled for programming via STK500 • P1 connected for programming via PonyProg, UISP, etc. • P1 also connected to AVR processor's UART1 (2nd serial port) • P2 unused • **AVR processor's UART0 not accessible