Atmel AVR In System Programming Dongle

Atmel offers a software package called the Atmel AVR ISP which allows the programming of AVR Microcontrollers in circuit with a simple dongle which is attached to the Parallel Port. This dongle is detailed below. It can be built cheaply, making it an ideal starting point for developing with ATMEL AVR micros.

The current release of the software is Version 2.65 which can be downloaded at ftp://www.atmel.com/pub/atmel/avr_isp.zip (875KB)

If you are seeking a Serial/RS232 Version, have a look at Atmel's Application Note AVR910 which details a serial programmer using at AT90S1200.
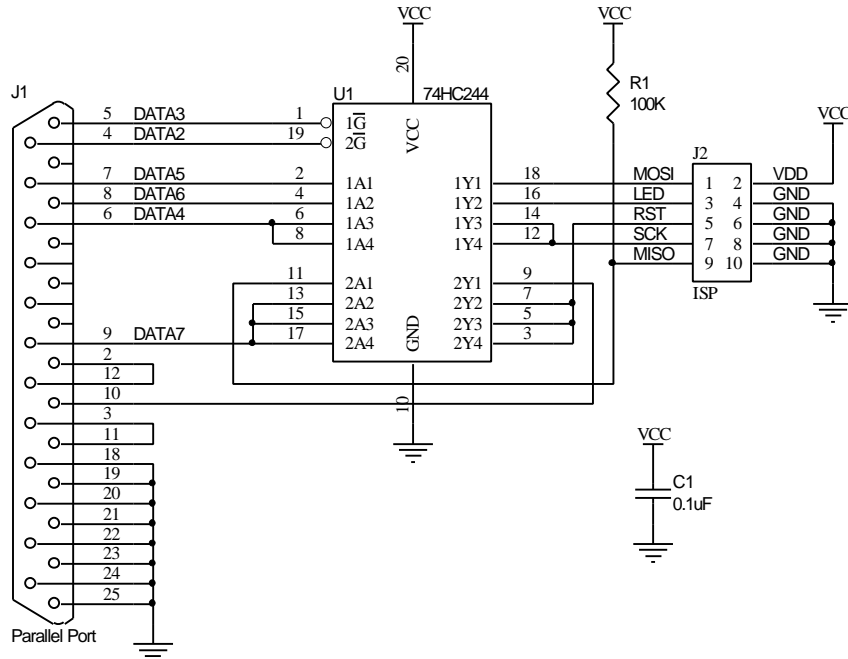

Figure 1 : Schematic for the ATMEL ISP Value Added Dongle

Using a 74HC244 Tri-State buffer as the main component, operation is extremely simple. The two loopback connections, pin 2 to 12 and 3 and 11 is used to identify the dongle. With both links in place the dongle is identified as a Value Added Pack Dongle. With only pins 2 and 12 links, it is reported as a STK300 or AVR ISP Dongle. With only 3 and 11 the dongle is reported as an STK200 or old Kanda ISP Dongle.

DATA2 and DATA3 of the Parallel Port Drive the TriState Outputs. A low will allow the passing of the serial clock and data during programming. MOSI, LED, SCK and Reset being outputs are buffered from the Parallel Port's DATA5, DATA6, DATA4 and DATA7 Respectively. The only input, MISO is fed into nACK, a status input of the Parallel Port.

There are two standard ISP Connectors for Atmel AVR Microcontroller ISP Programming. One standard is the 10 pin version using a DIL 5x5 header of 0.1" Pitch, shown in the above schematic. This is used on the ATMEL STK Kits. The other is a more compact 6 pin version, once again using a DIL 3x3 header of 0.1" pitch. This 6 pin version is the standard connector for ATMEL ISP Programmers.

The main advantage of the 10 pin header is the clean and easy use of 10 pin IDC crimp headers.

Name	Function	Description
MOSI	Master Out - Slave In	Data being transmitted to the part being programmed is sent on this pin
LED	Program LED	Optional Programming LED
RST	Target MCU Reset	Connects to Target AVR. Target AVR is programmed while in Reset State.
SCK	Shift Clock	Serial Clock Generated by the Programmer
MISO	Master In – Slave Out	Data received from the part being programmed is sent on this pin
VCC	ISP Power	Power Supply for the ISP. ISP Header must supply power to the dongle.
GND	Ground	Common Ground

6 Pin Header   10 Pin Header