

Arduino Duemilanove as ISP: ST500K protocol errors due to Serial Reset

[Years ago](#) I wrote about using the Arduino Micro as an ISP for use with a standalone ATMEGA micro controller.

I used this again every now and then, but got to the point where I wanted sort of a more permanent setup. As I had a spare Duemilanove and some prototype boards lying around, all I had to get was a DIP28 ZIF socket and start soldering.

Here's the Layout:

ATMEGA Pin 20 and 7 -> 5V

ATMEGA Pin 22 and 8 -> GND

RESET: ATMEGA Pin 1 -> Protoboard Pin 10

SCK: ATMEGA Pin 13 -> Protoboard Pin 13

MISO: ATMEGA Pin 12 -> Protoboard Pin 12

MOSI: ATMEGA Pin 11 -> Protoboard Pin 11

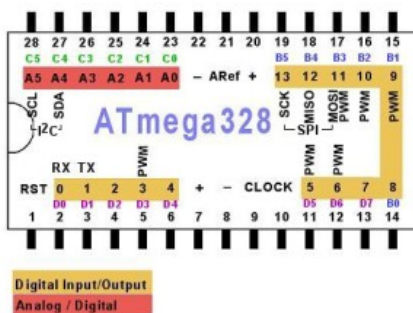
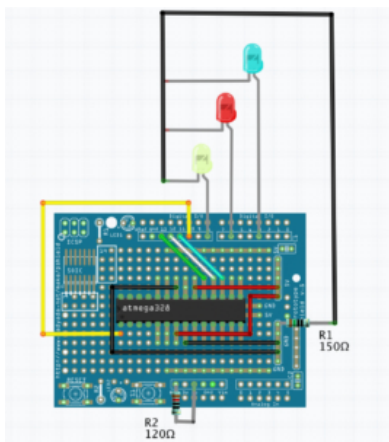
Yellow LED Anode -> Protoboard Pin 8

Red LED Anode -> Protoboard Pin 6

Green LED Anode -> Protoboard Pin 3

All LED Cathodes -> GND (attach a 150 Ohm resistor)

On the Protoboard, connect RSET and 5V through a 120 Ohm pull-up resistor



With this setup, I opened the ArduinoISP sketch included with Arduino IDE.
In my old tutorial I recommended downloading the sketch from Github, this has become obsolete.
The one include with recent versions Arduino IDE is far more advanced.

I had just these minor things changed in the sketch:

```
65 #endif
66
67 // Configure which pins to use:
68
69 // The standard pin configuration.
70 #ifndef ARDUINO_HOBBYLOADER2
71 #define ARDUINO_HOBBYLOADER2
72
73 #define RESET 10 // Use pin 10 to reset the target rather than 5S
74 #define LED_BUILTIN 8
75 #define LED_SCK 6
76 #define LED_MISO 9
77
78 // Uncomment following line to use the old Uno style wiring
79 // (using pin 11, 12 and 13 instead of the SPI header) on Leonardo, Due...
80 #define USE_OLD_STYLE_WIRING
81 #ifndef USE_OLD_STYLE_WIRING
82
83 #endif
84
85 #define PIN_MOSI 11
86 #define PIN_MISO 12
87 #define PIN_SCK 13
88
89 #endif
90
```

With this loaded onto the Duemilanove I could finally use it to burn standalone micros like a charm.

So, I took the solution upfront. This works for me.

The problem I had up to this point was a very unpleasant behaviour while burning the bootloader onto the micro, where I consistently got errors like these:

```
/Applications/Arduino.app/Contents/Java/hardware/tools/avr/bin/avrdude
-C/Applications/Arduino.app/Contents/Java/hardware/tools/avr/etc/avrdude.conf -v -patmega328p -cstk500v1 -P/dev/cu.usbserial-AH01GO57
-b19200 -e -Ulock:w:0x3F:m -Uefuse:w:0x05:m -Uhfuse:w:0xDA:m -Ulfuse:w:0xE2:m
```

```
avrdude: Version 6.3, compiled on Jan 17 2017 at 12:01:35
Copyright (c) 2000-2005 Brian Dean, http://www.bdmicro.com/
Copyright (c) 2007-2014 Joerg Wunsch
```

```
Using Port : /dev/cu.usbserial-AH01GO57
Using Programmer : stk500v1
Overriding Baud Rate : 19200
avrdude: stk500_getsync() attempt 1 of 10: not in sync: resp=0x15
avrdude: stk500_getsync() attempt 2 of 10: not in sync: resp=0x15
AVR Part : ATmega328P
Chip Erase delay : 9000 us
PAGEL : PD7
BS2 : PC2
RESET disposition : dedicated
RETRY pulse : SCK
serial program mode : yes
parallel program mode : yes
Timeout : 200
StabDelay : 100
CmdexeDelay : 25
SyncLoops : 32
```

ByteDelay : 0
PollIndex : 3
PollValue : 0x53
Memory Detail :

Block Poll Page Polled

Memory Type Mode Delay Size Indx Paged Size Size #Pages MinW MaxW ReadBack

```
-----  
eeprom 65 20 4 0 no 1024 4 0 3600 3600 0xff 0xff  
flash 65 6 128 0 yes 32768 128 256 4500 4500 0xff 0xff  
lfuse 0 0 0 0 no 1 0 0 4500 4500 0x00 0x00  
hfuse 0 0 0 0 no 1 0 0 4500 4500 0x00 0x00  
efuse 0 0 0 0 no 1 0 0 4500 4500 0x00 0x00  
lock 0 0 0 0 no 1 0 0 4500 4500 0x00 0x00  
calibration 0 0 0 0 no 1 0 0 0 0 0x00 0x00  
signature 0 0 0 0 no 3 0 0 0 0 0x00 0x00
```

Programmer Type : STK500

Description : Atmel STK500 Version 1.x firmware

avrdude: stk500_getparm(): (a) protocol error, expect=0x14, resp=0x14

avrdude: stk500_getparm(): (a) protocol error, expect=0x14, resp=0x02

avrdude: stk500_getparm(): (a) protocol error, expect=0x14, resp=0x10

Hardware Version: -1449398444

Firmware Version: -1073745528.444305

Topcard : STK502

Vtarget : 1.8 V

Varef : 0.0 V

Oscillator : Off

SCK period : 0.1 us

avrdude: stk500_initialize(): (b) protocol error, expect=0x10, resp=0x01

avrdude: initialization failed, rc=-1

Double check connections and try again, or use -F to override
this check.

avrdude: stk500_disable(): protocol error, expect=0x14, resp=0x10

avrdude done. Thank you.

Error while burning bootloader.

While I never observed this misbehaviour when using the Arduino Micro, the Duemilanove constantly refused to burn to the chip.

Unfortunately, there seems to be gazillions of people observing the very same error, but afar from "check the cabling", "check blahblah", there seems to be not much help on this matter. On the other hand, there are obviously people, who never encountered this issue. Or it is device or implementation dependant respectively.

Only after hours of searching and reading, I found [some people mentioning similar](#) issues with serial programmers and how they got away with disabling serial signals. That very moment I remembered reading about Arduino doing Reset on Serial many years ago.

I don't know, why this is not mentioned already in of the [Arduino as ISP](#) context (it should, I think). At least there is [official](#)

[documentatio](#) on how to disable reset on serial.

There's multiple solutions, from soldering, to just sticking resistors. Since I didn't want to tamper with the Arduino PCB, I've just added a removable resistor between RST and 5V. Since I didn't have a 120 ohm resistor at hands, I had to combine a 100 and a 20 ohm resistor to achieve the same effect.

Weehee! With the resistor in place, it finally works the way it should.

