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## Nano 3.0 Atmega328P-AU

<http://dx.com/p/arduino-nano-v3-0-81877>

but it doesn't work without bootloader

<http://club.dx.com/forums/forums.dx/threadid.1185512>

<http://club.dx.com/forums/forums.dx/threadid.1218851>

## avrdude

```
dpavlin@blue:~$ avrdude -c buspirate -P /dev/ttyUSB0 -p m328p -v
```

```
avrdude: Version 5.11.1, compiled on Mar 24 2013 at 00:54:55
Copyright (c) 2000-2005 Brian Dean, http://www.bdmicro.com/
Copyright (c) 2007-2009 Joerg Wunsch
```

```
System wide configuration file is "/etc/avrdude.conf"
User configuration file is "/home/dpavlin/.avrduderc"
User configuration file does not exist or is not a regular file, skipping
```

```
Using Port                : /dev/ttyUSB0
Using Programmer          : buspirate
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              :

```

Memory	Type	Mode	Delay	Block Size	Poll Indx	Paged	Size	Page Size	#Pages	MinW	MaxW	Polled ReadBack	
eeeprom		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 : BusPirate
Description      : The Bus Pirate

```

Detecting BusPirate...

```

avrdude: buspirate_readline(): #
avrdude: buspirate_readline(): RE
avrdude: buspirate_readline(): Bus Pirate v3.b clone w/different PIC
avrdude: buspirate_readline(): Firmware v6.1 r1676 Bootloader v4.4
avrdude: buspirate_readline(): DEVID:0x044F REVID:0x3003 (24FJ64GA004 A3)
avrdude: buspirate_readline(): http://dangerousprototypes.com
avrdude: buspirate_readline(): HiZ>
**

```

```

BusPirate: using BINARY mode
BusPirate binmode version: 1
BusPirate SPI version: 1
avrdude: AVR device initialized and ready to accept instructions

```

Reading | ##### | 100% 0.01s

```

avrdude: Device signature = 0x1e950f
avrdude: safemode: lfuse reads as 62
avrdude: safemode: hfuse reads as D9
avrdude: safemode: efuse reads as 7

```

```

avrdude: safemode: lfuse reads as 62
avrdude: safemode: hfuse reads as D9
avrdude: safemode: efuse reads as 7
avrdude: safemode: Fuses OK
BusPirate is back in the text mode

```

avrdude done. Thank you.

## bootloader update

### bus pirate

[http://dangerousprototypes.com/docs/Bus\\_Pirate\\_AVR\\_Programming](http://dangerousprototypes.com/docs/Bus_Pirate_AVR_Programming)

## But **which** bootloader to use? (hint: not optiboot!)

```
dpavlin@blue:~$ ard-parse-boards nano328 bootloader.file
ATmegaBOOT_168_atmega328.hex
```

## Ok, now flash it!

```
dpavlin@blue:~$ avrdude -c buspirate -P /dev/ttyUSB0 -p m328p -U flash:w:/usr/share/arduino/hardware
```

```
Detecting BusPirate...
```

```
**
```

```
BusPirate: using BINARY mode
```

```
avrdude: AVR device initialized and ready to accept instructions
```

```
Reading | ##### | 100% 0.01s
```

```
avrdude: Device signature = 0x1e950f
```

```
avrdude: NOTE: FLASH memory has been specified, an erase cycle will be performed
To disable this feature, specify the -D option.
```

```
avrdude: erasing chip
```

```
avrdude: reading input file "/usr/share/arduino/hardware/arduino/bootloaders/atmega/ATmegaBOOT_168_atmega328.hex"
```

```
avrdude: input file /usr/share/arduino/hardware/arduino/bootloaders/atmega/ATmegaBOOT_168_atmega328.hex
```

```
avrdude: writing flash (32670 bytes):
```

```
Writing | ##### | 100% 56.84s
```

```
avrdude: 32670 bytes of flash written
```

```
avrdude: verifying flash memory against /usr/share/arduino/hardware/arduino/bootloaders/atmega/ATmegaBOOT_168_atmega328.hex
```

```
avrdude: load data flash data from input file /usr/share/arduino/hardware/arduino/bootloaders/atmega/ATmegaBOOT_168_atmega328.hex
```

```
avrdude: input file /usr/share/arduino/hardware/arduino/bootloaders/atmega/ATmegaBOOT_168_atmega328.hex
```

```
avrdude: input file /usr/share/arduino/hardware/arduino/bootloaders/atmega/ATmegaBOOT_168_atmega328.hex
```

```
avrdude: reading on-chip flash data:
```

```
Reading | ##### | 100% 55.22s
```

```
avrdude: verifying ...
```

```
avrdude: 32670 bytes of flash verified
```

```
avrdude: safemode: Fuses OK
```

```
avrdude done. Thank you.
```

## After re-flash using bus pirate as ISP from Arduino GUI fuses changed:

```
avrdude: safemode: lfuse reads as FF
```

```
avrdude: safemode: hfuse reads as DA
```

```
avrdude: safemode: efuse reads as 5
```

```
avrdude: safemode: Fuses OK
```

## usbasp bootloader update

```
Sun Jan 12 11:27:34 2020] usb 8-2: new low-speed USB device number 4 using uhci_hcd
```

```
[Sun Jan 12 11:27:34 2020] usb 8-2: New USB device found, idVendor=16c0, idProduct=05dc, bcdDevice=1.00
```

```
[Sun Jan 12 11:27:34 2020] usb 8-2: New USB device strings: Mfr=1, Product=2, SerialNumber=0
```

```
[Sun Jan 12 11:27:34 2020] usb 8-2: Product: USBasp
```

```
[Sun Jan 12 11:27:34 2020] usb 8-2: Manufacturer: www.fischl.de
```

```
dpavlin@x200:~$ avrdude -v -patmega328p -cusbasp
```

```
avrdude: Version 6.3-20171130
Copyright (c) 2000-2005 Brian Dean, http://www.bdmicro.com/
Copyright (c) 2007-2014 Joerg Wunsch
```

```
System wide configuration file is "/etc/avrdude.conf"
User configuration file is "/home/dpavlin/.avrduderc"
User configuration file does not exist or is not a regular file, skipping
```

```
Using Port           : usb
Using Programmer     : usbasp
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        :
```

Memory	Type	Mode	Delay	Block Size	Poll Indx	Paged	Size	Page Size	#Pages	MinW	MaxW	Polled 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 : usbasp
Description      : USBasp, http://www.fischl.de/usbasp/
```

```
avrdude: auto set sck period (because given equals null)
avrdude: warning: cannot set sck period. please check for usbasp firmware update.
avrdude: AVR device initialized and ready to accept instructions
```

```
Reading | ##### | 100% 0.01s
```

```
avrdude: Device signature = 0x1e950f (probably m328p)
avrdude: safemode: lfuse reads as FF
avrdude: safemode: hfuse reads as DA
avrdude: safemode: efuse reads as FD
```

```
avrdude: safemode: lfuse reads as FF
avrdude: safemode: hfuse reads as DA
avrdude: safemode: efuse reads as FD
avrdude: safemode: Fuses OK (E:FD, H:DA, L:FF)
```

```
avrdude done. Thank you.
```

## flash ond nano bootloader

this is old nano bootloader, it doesn't work on 115200 but on 57600 with avrdude

```
dpavlin@x200:~$ avrdude -v -patmega328p -cusbasp -U flash:w:/tmp/nuc/opt/arduino/hardware/arduino
```

## flash optiboot

```
dpavlin@x200:~$ avrdude -v -patmega328p -cusbasp -U flash:w:/tmp/nuc/opt/arduino/hardware/arduino
```

## add bus pirate to arduino GUI

<http://taylanayken.wordpress.com/2011/05/04/using-bus-pirate-with-arduino-ide/>

```
root@blue:~# grep buspirate /usr/share/arduino/hardware/arduino/programmers.txt
buspirate.name=The Bus Pirate
buspirate.communication=serial
buspirate.protocol=buspirate
```

## Simulators/Emulators

### emulino

console output, somewhat large network on github

<https://github.com/ghewgill/emulino>

### simuino

ncurses interface, single stepping, doesn't have source control link, can't compile it

<http://code.google.com/p/simuino/>

### emulare

Requires .net, need to test it with mono

<http://emulare.sourceforge.net/>

### simavr

- <http://gitorious.org/simavr>
- <https://github.com/buserror-uk/simavr> (more up-to-date according to mailing list)
- <https://groups.google.com/forum/#!forum/simavr>

## **programming sketches**

- [https://github.com/nickgammon/arduino\\_sketches](https://github.com/nickgammon/arduino_sketches)

## **DebugWire protocol**

<http://www.ruemohr.org/docs/debugwire.html>

## **Internal ADC reference**

[https://github.com/Sensorslot/ADC\\_Test/blob/master/ADC\\_Test.ino](https://github.com/Sensorslot/ADC_Test/blob/master/ADC_Test.ino)