



Reference

Voltage Reference Enable Signals and Start-up Time

The voltage reference has a start-up time that may influence the way it should be used. The start-up time is given in Table 16. To save power, the reference is not always turned on. The reference is on during the following situations:

1. When the BOD is enabled (by programming the BODEN Fuse).
2. When the bandgap reference is connected to the Analog Comparator (by setting the ACBG bit in ACSR).
3. When the ADC is enabled.

WATCHDOG
RESET
(MCUCSR)

Subiecte SOC 2013

1. In cazul in care fosc WD este de 1071500 Hz si fosc este de 14250.23 KHz atunci timpul suplimentar de pornire {START-UP} pt ATmega16 este:

- a) 3823us b) 4096us c) 3963us d) 4300us

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$$f_{WD} = 1071500 \text{ Hz} \Rightarrow T_{WD} = 0,933 \mu\text{s}$$

$$f_{osc} = 14250,23 \text{ KHz} = 14250230 \text{ Hz} \Rightarrow T_{osc} = 0,07 \mu\text{s}$$

$$\Rightarrow \text{Timp-out-ul de pornire este de } 4096 \text{ cicluri} \cdot T_{WD}/\text{ciclu} = 4096 \cdot 0,933 \mu\text{s} = 3821,56 \mu\text{s}$$

3. Daca UBRR=185 (U2X=1) si fosc = 14.25 MHz atunci pt un Baud Rate de 9.6 Kbps eroarea de bit este:

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- a) 1.31% b) 0.22% c) 0.24 d) 5.30%

$$\text{Daca } UBRR = 185 \Rightarrow BAUD = \frac{14250000}{8 \cdot (185 + 1)} = 9576,61 \text{ bps} \approx 9,576 \text{ Kbps}$$

\uparrow
U2X=1

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$$\text{Eroarea de bit este: } E(\%) = \left(\frac{BAUD}{9,6 \text{ Kbps}} - 1 \right) \cdot 100 = \left(\frac{9,576}{9,6} - 1 \right) \cdot 100 \approx -0,25\%$$

4. Daca UBRR=22 (U2X=0) si fosc = 14.25 MHz atunci pt un Baud Rate de 38400 Kbps eroarea de bit este:

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- a) 3.12% b) 0.24 c) 0.0% d) 0.84

$$\text{Daca } UBRR = 22 \Rightarrow BAUD = \frac{14250000}{16 \cdot (22 + 1)} = 38722,826 \text{ bps} \approx 38,723 \text{ Kbps}$$

\uparrow
U2X=0

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$$\text{Eroarea de bit este: } E(\%) = \left(\frac{BAUD}{38,4 \text{ Kbps}} - 1 \right) \cdot 100 = \left(\frac{38,723}{38,4} - 1 \right) \cdot 100 \approx 0,84\%$$

5. Daca fixam un Baud Rate de 19.2 Kbps si avem fosc = 15.36 MHz atunci valoarea lui UBRR pt U2X=0 este:

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- a) 24 b) 199 c) 99 d) 49

$$U2X=0 \Rightarrow UBRR = \frac{15360000}{16 \cdot 19200} - 1 = 49$$

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6. In cazul ATmega16 memoria EEPROM are dimensiunea de:
a) 1K b) 256 c) 512 d) 2k

7. In cazul ATmega16 memoria FLASH are dimensiunea de:
a) 1K b) 4K c) 16K d) 32K

8. In cazul ATmega16 memoria SRAM are dimensiunea de:
a) 4K b) 512 c) 256 d) 1024B

9. In cazul in care timpul masurat TWD (timp watchdog timer) este de 876.2ms atunci frecventa oscilatorului fosc WD este de:
a) 1071.5KHz b) 0.9902MHz c) 1123.5KHz d) 1.196MHz

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$$t_{wd} = 876,2 \text{ ms} = N_{cicli} \cdot T_{osc} \quad | : T_{osc} \Rightarrow \frac{1}{f_{osc}} \cdot 876,2 \text{ ms} = N_{cicli}$$

$$\Rightarrow f_{osc} = \frac{N_{cicli}}{876,2 \text{ ms}}$$

$$Pt. WBP = 110 \Rightarrow N_{cicli} = 1048576 \Rightarrow f_{osc} = 1,196 \text{ MHz}$$

10. In cazul in care frecventa oscilatorului fosc WD (oscilator watchdog timer) este 1.1235MHz atunci timpul TWD este de:
a) 120.86ms b) 140.34ms c) 116.66ms d) 380.3ms

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$$f_{osc} = 1,1235 \text{ MHz} \Rightarrow T_{osc} = 0,89 \text{ ms}$$

$$t_{wd} = N_{cicli} \cdot T_{osc}$$

$$Pt. WBP = 011 \Rightarrow N_{cicli} = 131072 \Rightarrow t_{wd} = 131072 \cdot 0,89 \text{ ms} = 116,654 \text{ ms}$$

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11. Dimensiunea magistralei de adrese a procesorului ATmega16 este:
a) 14 biti b) 9biti c) 13 biti d) 8 biti