

Seminar

Pregled AVR μ C www.atmel.com

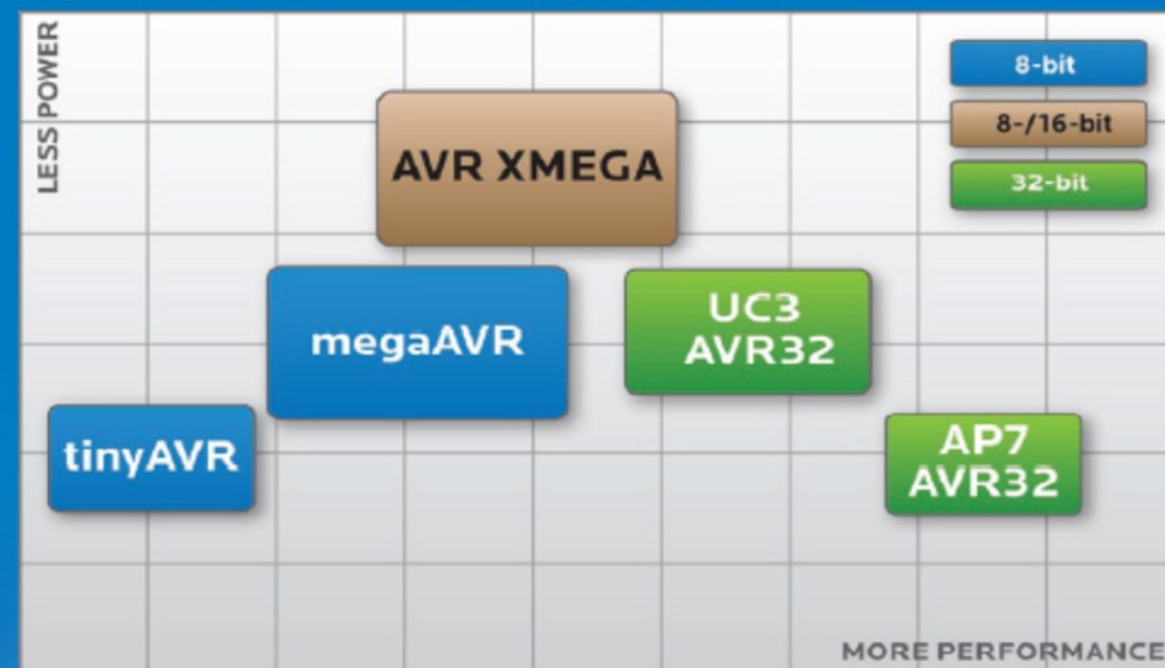
M.Jankovec

ATMEL μ C

- AVR
 - AVR 8-bit RISC
 - AVR32 32-bit RISC (UC3 in AP7 jedro)
- AT91SAM 32-bit ARM (Cortex, ARM7,9,11)
- AT91CAP (Customisable μ C, MP block)
- DIOPSIS (dual core: ARM+ floating point DSP)
- 8051 arhitektura (z dodatki in nadgradnjami)
- MARC4 4-bit arhitektura (poceni, low power)
- MCU wireless (ZigBee/IEEE802.15.4)

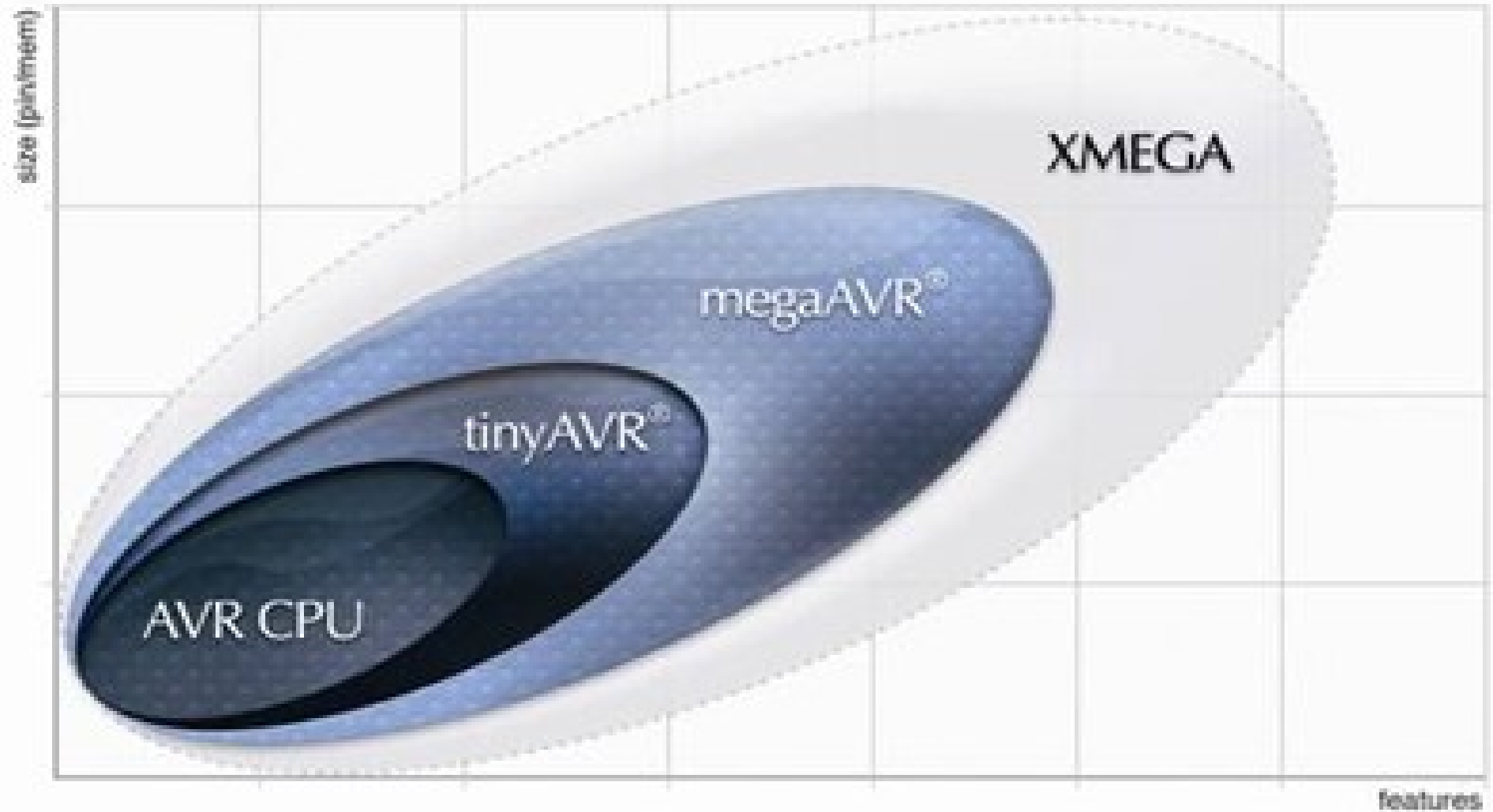
ATMEL AVR μ C

Highest performance with no power penalty



- ▶ tinyAVR
1-16 KBytes Flash, 8-32 pin packages
- ▶ megaAVR
4-256 KBytes Flash, 28-100 pin packages
- ▶ AVR XMEGA
16-384 KBytes Flash, 44-100 pin packages
- ▶ AVR32 UC3
16-512 KBytes Flash, 48-144 pin packages
- ▶ AVR32 AP7
Up to 32 KBytes On-chip SRAM,
196-256 pin packages

Družine AVR 8-bit



Družine AVR 8-bit

• tinyAVR

- FLASH < 16 kB
- SRAM < 512 B
- EEPROM < 512 B
- 0.7V ATtiny43U

• megaAVR

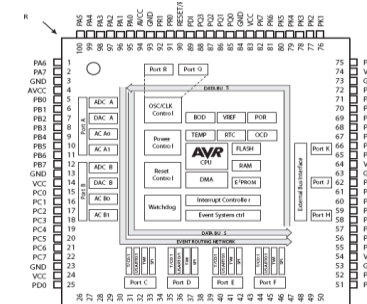
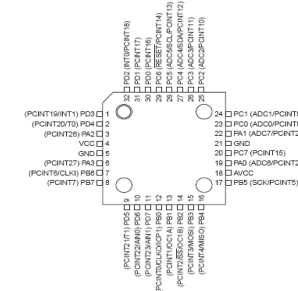
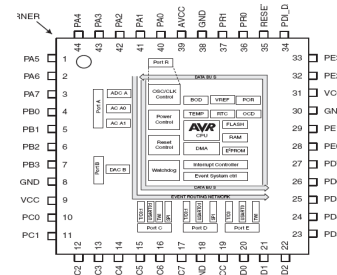
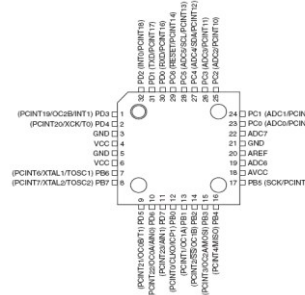
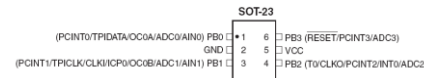
- Strojni množilnik
- FLASH < 256 kB
- SRAM < 8 kB
- EEPROM < 4kB

• XMEGA

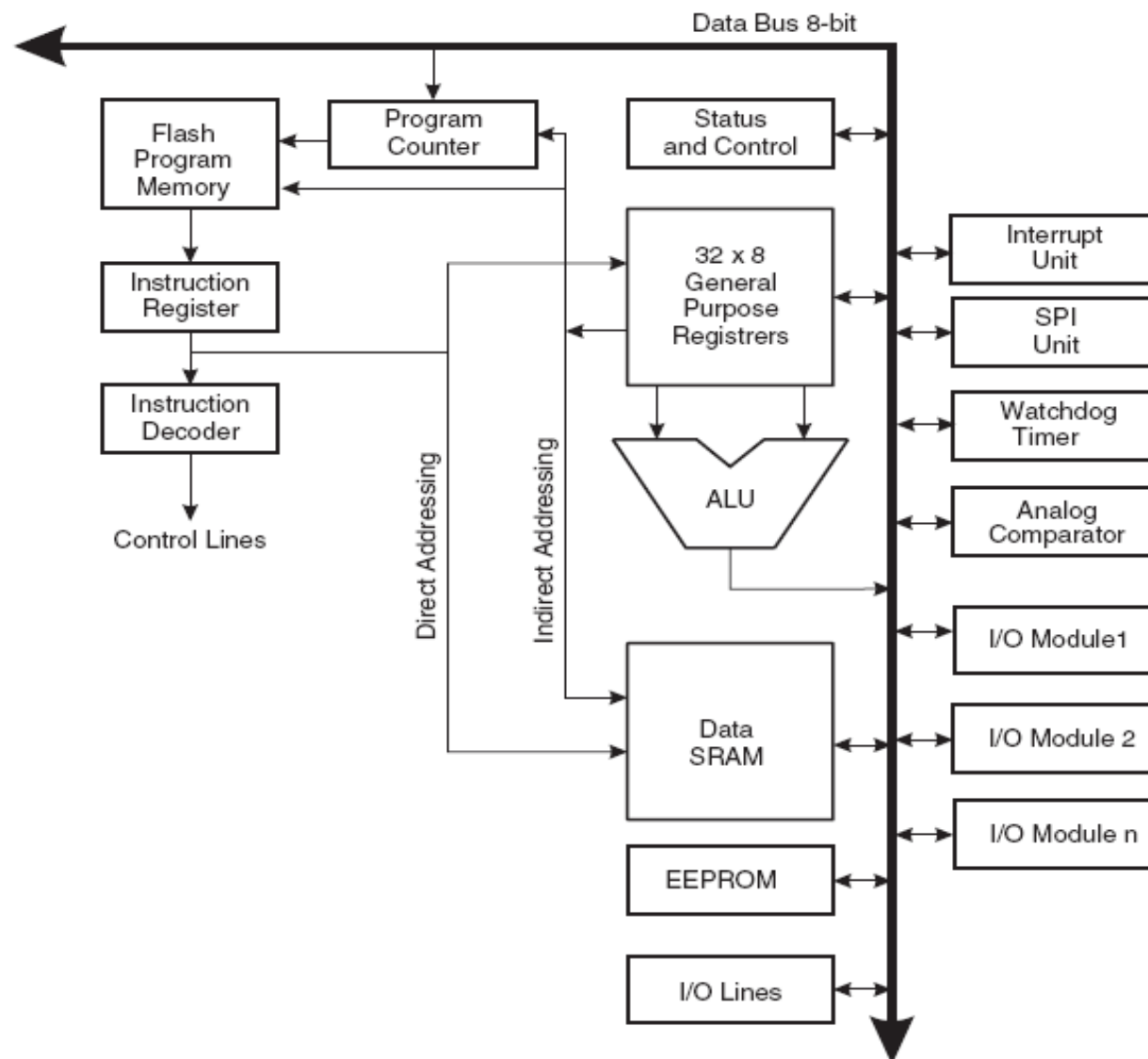
- FLASH < 384 kB
- SRAM < 32 kB
- EEPROM < 4kB
- napredna periferija
- DMA in Event system

• Application oriented AVR

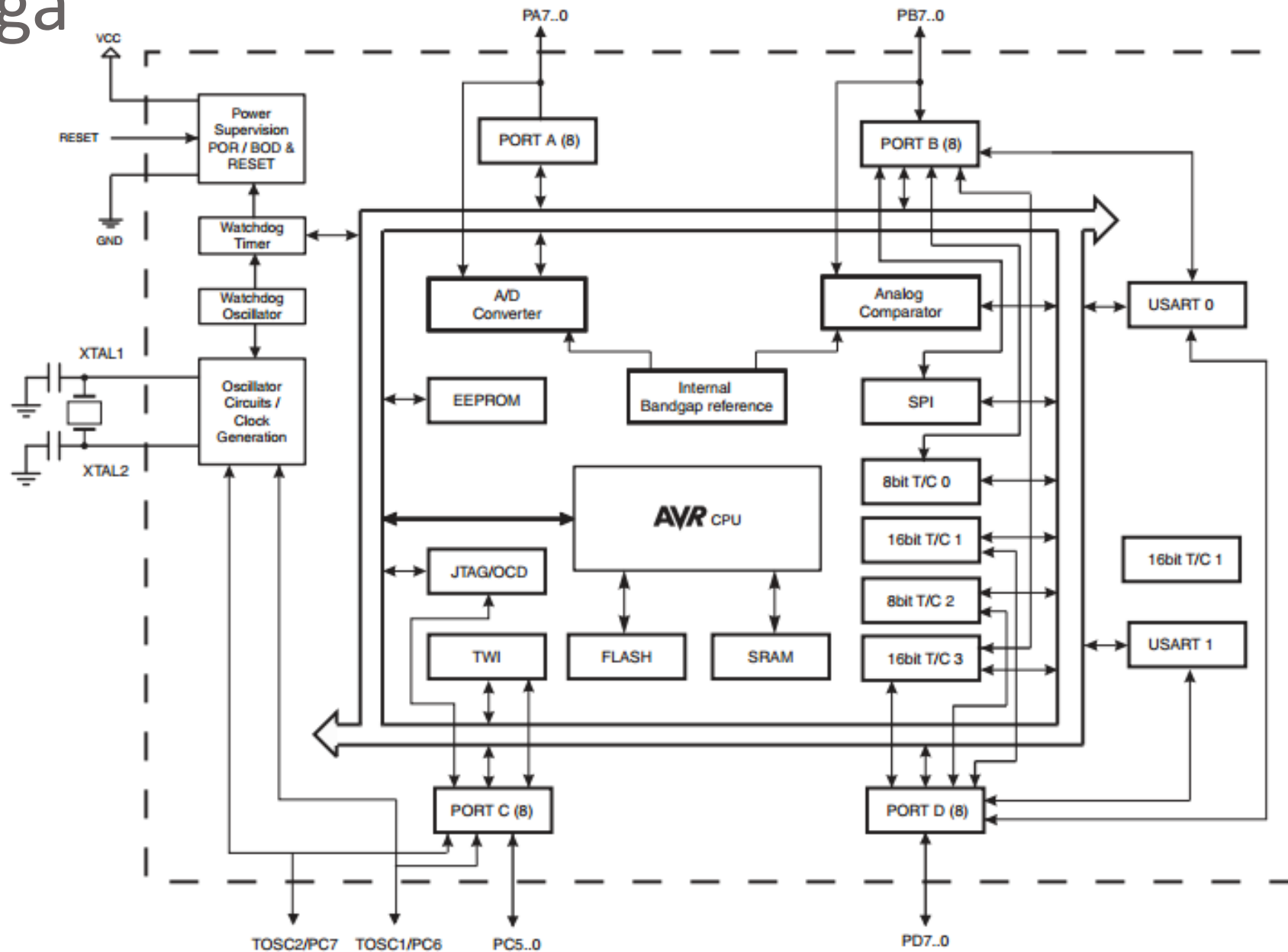
- LCD, USB, CAN, Motor, Automotive, Lightning, Battery, Wireless, Remote Access Control



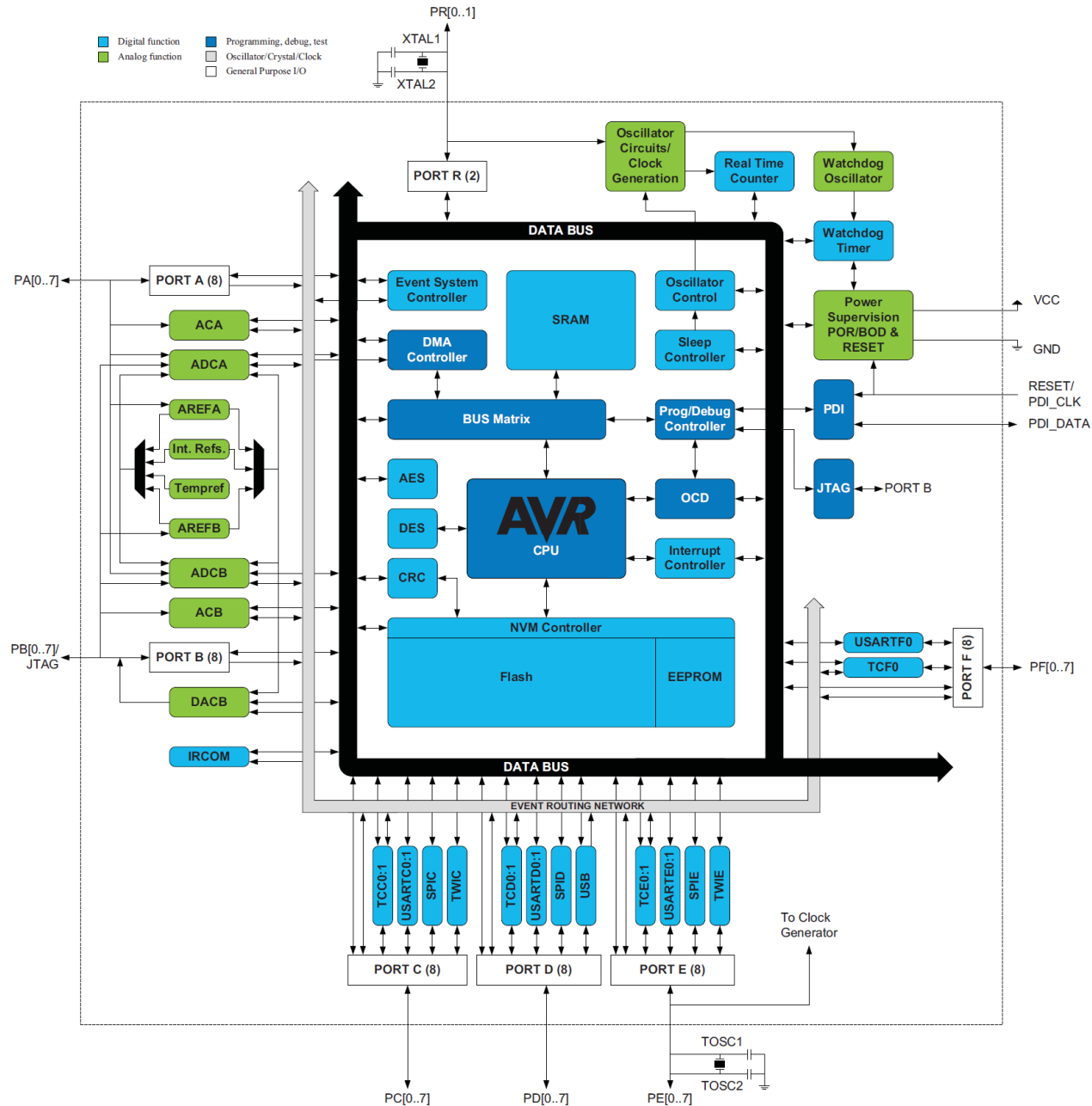
AVR jadro



AVR mega



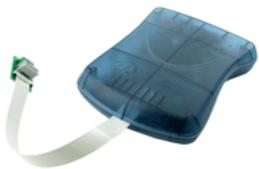
AVR xmega



Tipični predstavniki AVR

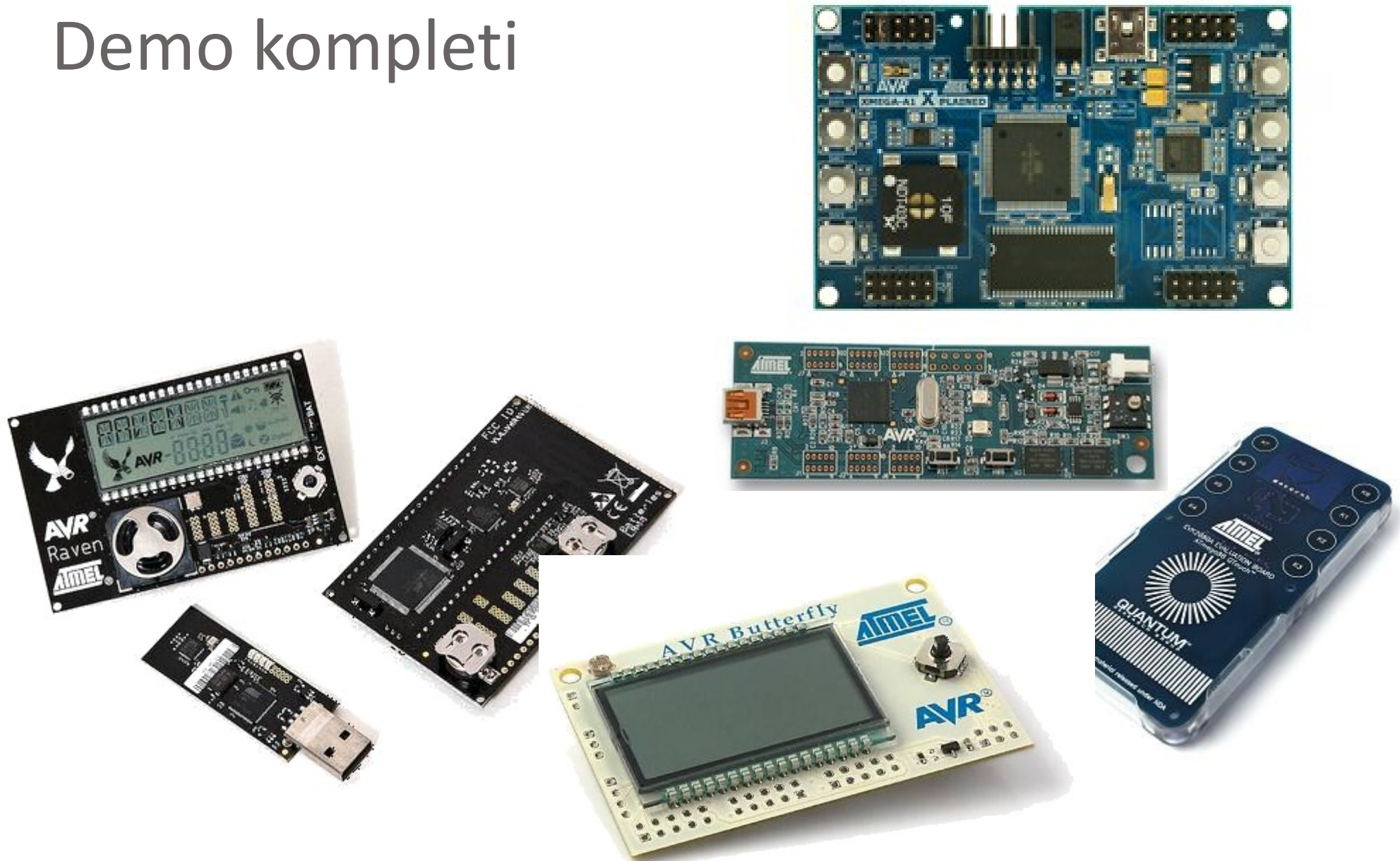
μC	Ohišje	I/O	FLASH	RAM	EE	ADC	Timer	Cena 1 kos	Cena 100 kos
ATtiny10	SOT23-6	4	1kB	32B	-	4x8bit	1x16bit 2xPWM	0.52€	0.38€
ATtiny24A	20QFN	12	2kB	128B	128B	8x10bit	1x8, 1x16bit 4xPWM	0.86€	0.64€
ATtiny13A	8SOIC	6	1kB	64B	64B	4x10bit	1x8bit 2xPWM	1.11€	0.72€
ATmega8	32TQFP	23	8kB	1kB	512B	8x10bit	2x8, 1x16bit 3xPWM	1.75€	1.3€
ATmega88PA	32TQFP	23	8kB	1kB	512B	8x10bit	2x8, 1x16bit 6xPWM	2.88€	1.88€
ATmega1284PA	44TQFP	32	128kB	16kB	4kB	8x10bit	2x8, 2x16bit 6xPWM	8.04€	5.27€
ATmega2560V	100TQFP	86	256kB	8kB	4kB	16x10bit	2x8, 4x16bit, 16xPWM	19.6€	8.93€
ATmega32U2 (USB)	32TQFP	22	32kB	1kB	1kB	-	1x8, 1x16bit 5xPWM	2.96€	2.19€
ATxmega16A4	64TQFP	34	16kB	2kB	1kB	12x12bit 2xDAC	5x16bit 16xPWM	2.96€	2.19€
ATxmega128D3	64TQFP	50	128kB	8kB	2kB	16x12bit 2xDAC	5x16bit 16xPWM	3.87€	2.87€
ATxmega128A1	100TQFP	78	128kB	8kB	2kB	16x12bit 4xDAC	8x16bit 24xPWM	11.09€	5.31€

Razvojna orodja



- AVR ISP mkII
 - in-circuit SPI programmer
- AVR Dragon
 - SPI, Paralel, JTAG, debugWIRE
- AVR JTAG ICE mkII
 - JTAG in debugWIRE
- STKxxx starter kits
 - Tipke, LED, RS-232, serial EEPROM
 - SPI in paralelno programiranje
 - Generator ure, napajalnih napetosti
 - Različni adapterji

Demo kompleti

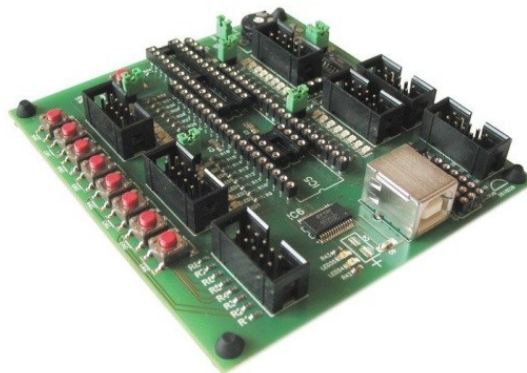
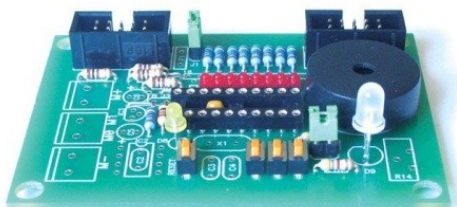


Razvojna orodja drugih proizvajalcev

- Arduino <http://arduino.cc>



- Svet elektronike – Bascom in mikro/mini/mega pin
<http://www.svet-el.si/proizvodi-in-storitve/razvojna-orodja>



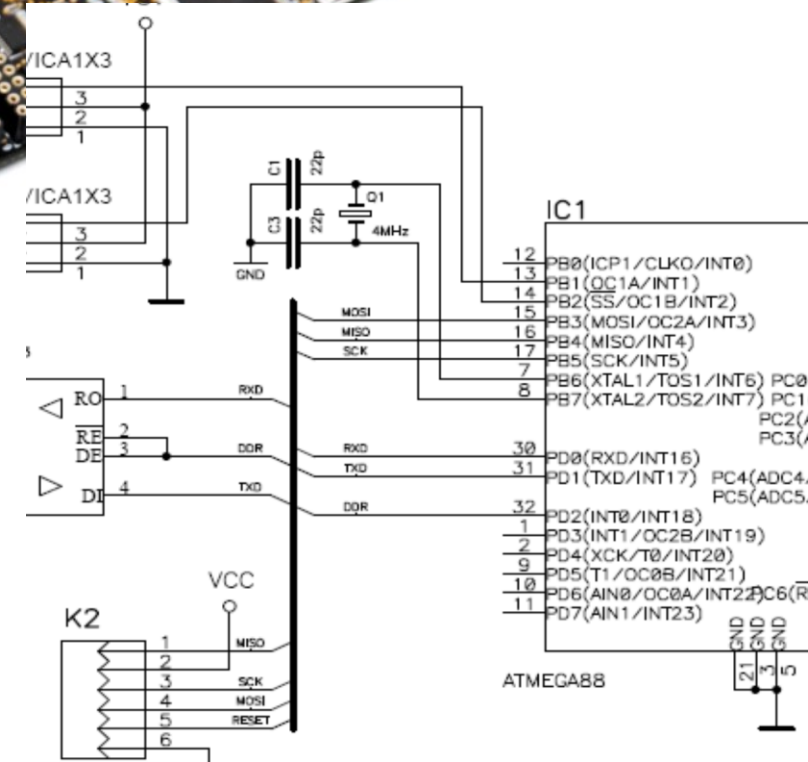
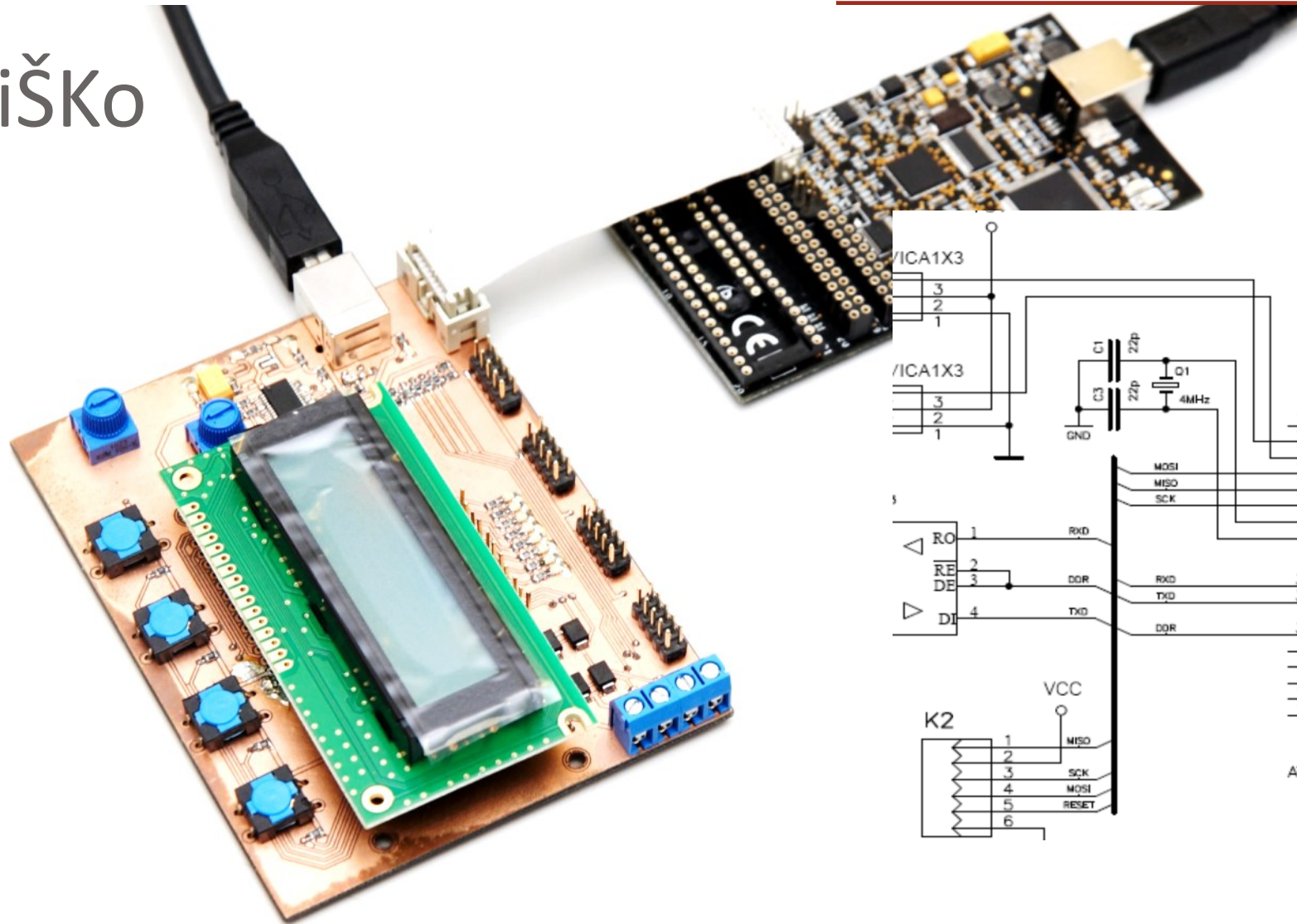
Samogradnja

- USBasp USB programator (open source)
 - <http://www.fischl.de/usbasp/>
- AVRUSBProg (VolkD) - 24.4€
 - www.elektronik.si (maxi forum)
 - Kompatibilen z AVR studiom
 - <http://www.tuxgraphics.org/>
- USBtinyISP (open source)
 - <http://www.ladyada.net/make/usbtinyisp/>
- AVR910
 - <http://www.mikrocontroller-projekte.de/Mikrocontroller/AVR-Prog/>

Razvojna okolja

- BASCOM AVR – BASIC – 89€
 - www.mcselec.com,
- WinAVR – opensource gcc
 - <http://winavr.sourceforge.net/>
- iMAGEcraft – C - \$249
 - www.imagecraft.com/
- Codevision – C – 150€
 - www.hpinfotech.ro
- IAR AVR – C - ∞€
 - www.iar.com
- AVR studio 6
 - http://www.atmel.com/Microsite/atmel_studio6/

MišKo



<http://lpvo.fe.uni-lj.si/izobrazevanje/1-stopnja-vs/osnove-mikroprocesorske-elektronike-ome/#>

