

I/O Ports

ATmega128





- Port A-F ... 8 bit
- Port G ... 5 bit

- Registers:
 - PORTx Data register
 - DDRx Data direction register 0...input 1...output
 - PINx Input pins

- Most pins are multiplexed with other peripherals

Special Function IO Register



SFIOR	7	6	5	4	3	2	1	0
	TSM	-	-	-	ACME	PUD	PSR2	PSR10
	R/W	R	R	R	R/W	R/W	R/W	R/W
	0	0	0	0	0	0	0	0

PUD Pull-up Disable

- (PSR10 Prescaler for Timer/Counter 1 and 0
- PSR2 Prescaler for Timer/Counter 2
- ACME Analog Comparator Multiplexer Enable
- TSM Timer/Counter Synchronization Mode)



Pin configuration

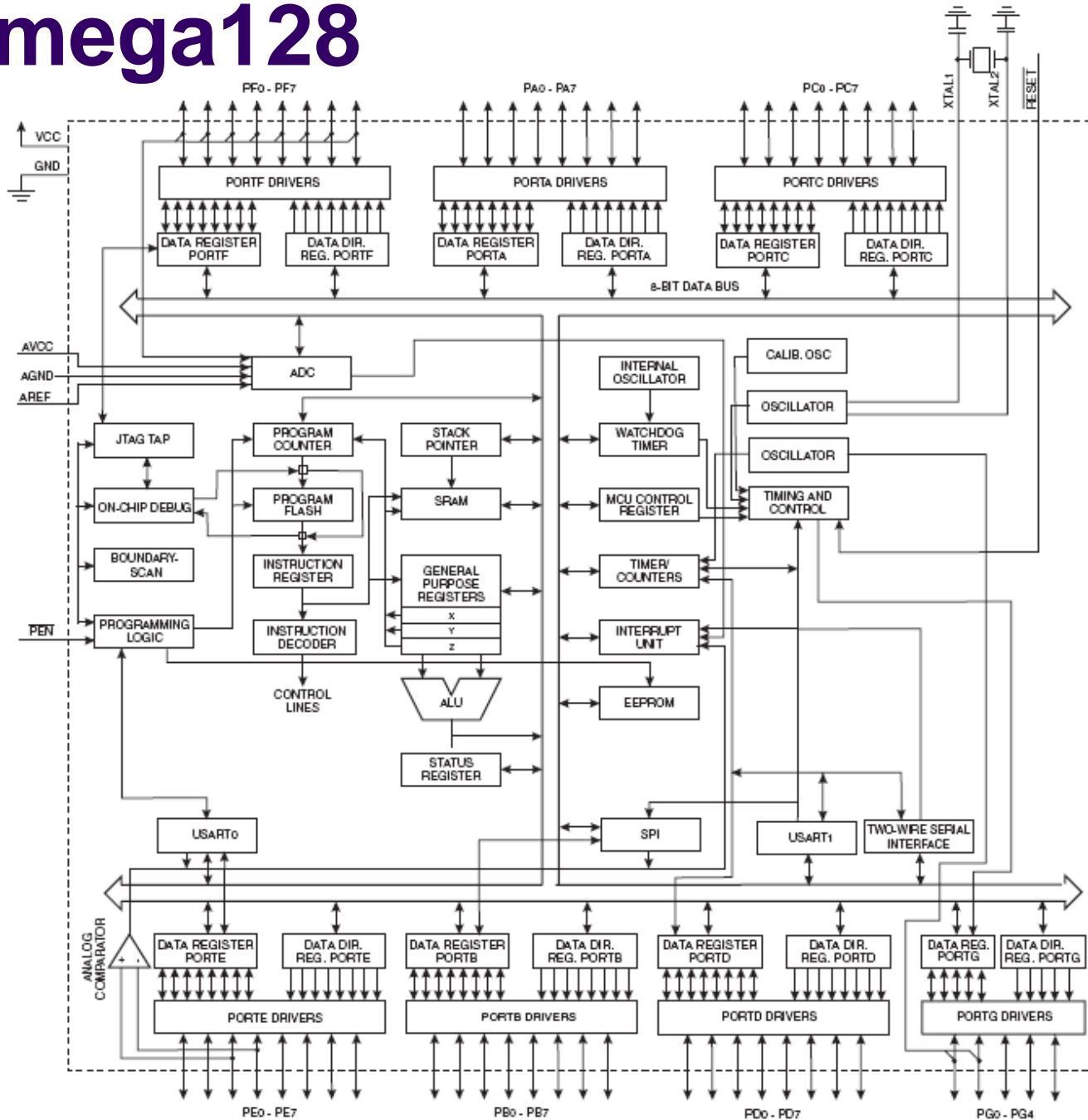
- $DDR_{xn}=0 \Rightarrow$ Input pin
 - $PORT_{xn}=1 \Rightarrow$ pull-up activated
 - $PORT_{xn}=0 \Rightarrow$ pull-up deactivated, „tri-state“
 - *PIN_{xn} is the input value*
- $DDR_{xn}=1 \Rightarrow$ Output pin
 - $PORT_{xn}=1 \Rightarrow$ high level on pin
 - $PORT_{xn}=0 \Rightarrow$ low level on pin
 - *PIN_{xn} shows the value*
- $PUD=0 \Rightarrow$ all pull-ups deactivated regardless DDR
- beware on the input – output changes
- beware about immediate reading of the outputted value



Example

```
ldi r16, 0xC3           ; 11000011
ldi r17, 0x0f           ; 00001111
out PORTB, r16
out DDRB, r17
nop
in r16, PINB
```

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Multiplex PORTA

- External memory interface
 - address high byte, data



Multiplex PORTB

- SPI
- Timer/Counter0
- Timer/Counter1
- Timer/Counter2



Multiplex PORTC

- External memory interface
 - address low byte



Multiplex PORTD

- Timer/Counter1
- Timer/Counter2
- External Interrupt 0-3
- USART1
- UART1
- Two-wire Serial Interface



Multiplex PORTE

- External Interrupt 4-7
- Timer/Counter3
- Analog Comparator
- UART0



Multiplex PORTF

- ADC
- JTAG



Multiplex PORTG

- Timer Oscillator
- External memory interface
 - control pins