

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

PORT B (for example)



PORTB							
7	6	5	4	3	2	1	0
PORTB7	PORTB6	PORTB5	PORTB4	PORTB3	PORTB2	PORTB1	PORTB0
R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W
0	0	0	0	0	0	0	0

DDRB							
7	6	5	4	3	2	1	0
DDB7	DDB6	DDB5	DDB4	DDB3	DDB2	DDB1	DDB0
R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W
0	0	0	0	0	0	0	0

PINB							
7	6	5	4	3	2	1	0
PINB7	PINB6	PINB5	PINB4	PINB3	PINB2	PINB1	PINB0
R	R	R	R	R	R	R	R
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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



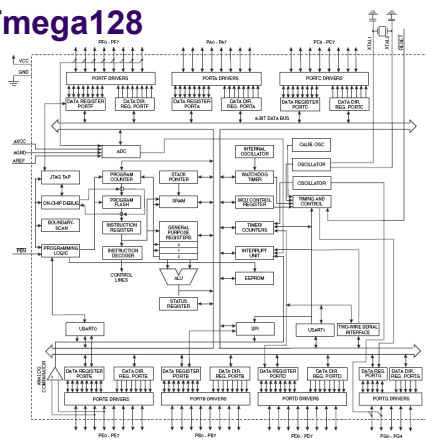
- DDRxn=0 ⇒ Input pin
 - PORTxn=1 ⇒ pull-up activated
 - PORTxn=0 ⇒ pull-up deactivated, „tri-state“
 - PINxn is the input value
- DDRxn=1 ⇒ Output pin
 - PORTxn=1 ⇒ high level on pin
 - PORTxn=0 ⇒ low level on pin
 - PINxn shows the value
- PUD=0 ⇒ all pull-ups deactivated regardless DDR
- beware on 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
```

ATmega128



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

