



Instructions

8-bit AVR




Addressing modes

- Direct
 - Direct register, single register
 - Direct register, two registers
 - I/O direct
 - Data direct
 - Direct program
- Relative
 - Relative program



Addressing modes

- Indirect
 - Data indirect
 - Indirect program
- Indirect⁺⁺
 - Data indirect with displacement
 - Data indirect with pre-decrement
 - Data indirect with post-increment



Operands

Rd Destination (and source) register in the Register File

Rr Source register in the Register File

R Result after instruction is executed

K Constant data

k Constant address


b Bit in the Register File or I/O Register (3-bit)

s Bit in the Status Register (3-bit)

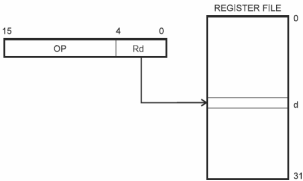
X,Y,Z Indirect Address Register
(X=R27:R26, Y=R29:R28, Z=R31:R30)

A I/O location address

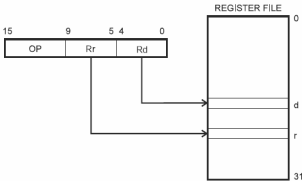
q Displacement for direct addressing (6-bit)



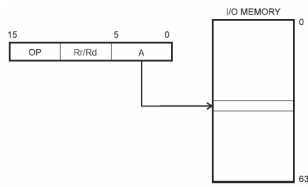
Register Direct, single register



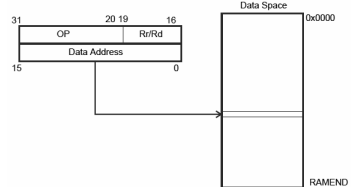
Register Direct, two registers



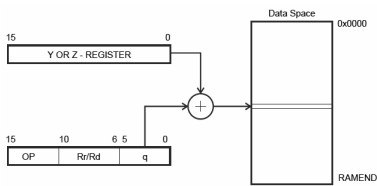
I/O Direct



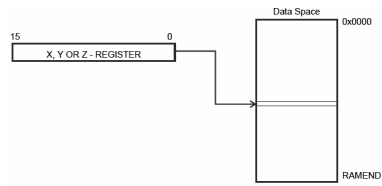
Data Direct



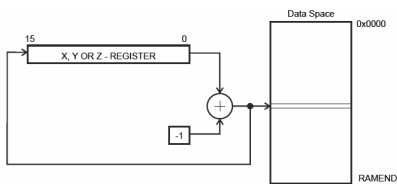
Data Indirect with Displacement



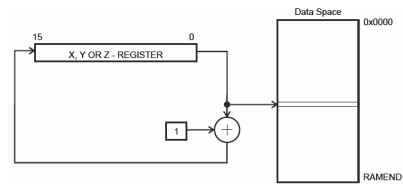
Data Indirect



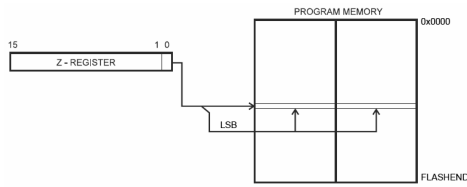
Data Indirect with Pre-decrement



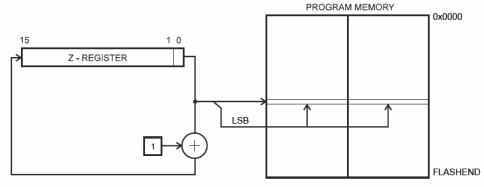
Data Indirect with Post-increment



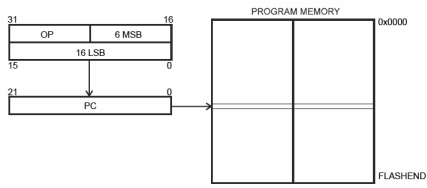
Program Memory Constant



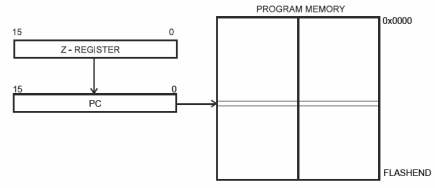
Program Memory with Post-increment



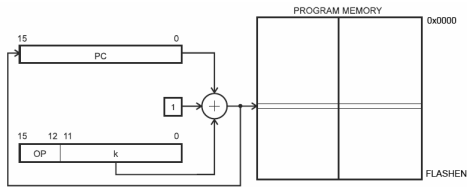
Direct Program



Indirect Program



Relative Program



Instructions

- Arithmetic and Logic
- Data Transfer
- Bit and Bit-test
- Branch
- MCU Control

Arithmetic and Logic

- ADD SUB SUBI
- ADC SBC SBCI
- ADIW SBIW
- INC DEC TST
- AND ANDI
- OR ORI
- EOR
- COM NEG
- SBR CBR
- SER CLR
- MUL MULS MULSU
- FMUL FMULS FMULSU



Data Transfer

- MOV MOVW
- LD LDI LDS LDD
- ST STS STD
- LPM ELPM
- SPM
- IN OUT
- PUSH POP
- LDI Rd, K
- LDS Rd, k
- LD Rd, X
- LD Rd, X+
- LD Rd, -X
- LDD Rd, Y+q
- LPM
- LPM Rd, Z
- LPM Rd, Z+



Bit and Bit-test

- LSL LSR
- ROL ROR
- ASR
- SWAP
- BSET BCLR
- SBI CBI
- BST BLD
- SEx CLx
{C,N,Z,I,S,V,T,H}



Branch

- JMP RJMP IJMP EIJMP
- CALL RCALL ICALL
EICALL
- RET RETI
- CPSE CP CPC CPI
- SBRC SBRS
- SBIC SBIS
- BREQ BRNE
- Z BREQ BRNE
- C BRCS=BRLO
BRCC=BRSH
- N BRMI BRPL
- N+V BRGE BRLT
- H BRHS BRHC
- T BRTS BRTC
- V BRVS BRVC
- I BRIE BRID



MCU Control

- BREAK
- NOP
- SLEEP
- WDR

