

# Instruction Set

*GilDev Breadboard Computer*

Instruction	Opcode	Size (bytes)	Update flags	Meaning	Description
NOP	0000	1	No	No OPeration	Do nothing
LDA	0001	2	No	LoaD Address	Load memory content at address given by operand byte in accumulator
LDI	0010	2	No	LoaD Immediate	Load operand byte in accumulator
STA	0011	2	No	STore Address	Store content of accumulator in memory at address given by operand byte
ADD	0100	2	Yes	ADD	Add memory content at address given by operand byte to accumulator
ADI	0101	2	Yes	ADd Immediate	Add operand byte to accumulator
SUB	0110	2	Yes	SUBstract	Subtract memory content at address given by operand byte from accumulator
SUI	0111	2	Yes	SUBstract Immediate	Subtract operand byte from accumulator
JMP	1000	2	No	JuMP	Jump to address given by operand byte
JPN	1001	2	No	JumP Negative	Jump to address given by operand byte if N flag is set
JPP	1010	2	No	JumP Positive	Jump to address given by operand byte if N flag and Z flag are not set
JPC	1011	2	No	JumP Carry	Jump to address given by operand byte if C flag is set
JPZ	1100	2	No	JumP Zero	Jump to address given by operand byte if Z flag is set
OUT	1101	1	No	OUTput	Show content of accumulator on the display
INP	1110	1	No	INPut	Load input number in accumulator
HLT	1111	1	No	HaLT	Stops the clock

# Control Signals

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Name	Meaning	Description
HALT	HALT	Stops the clock
FLGU	FLaGs Update	Update flags register using ALU's current output
MARI	Memory Address Register In	Load from bus into MAR
IRGI	Instruction ReGister In	Load from bus into IR
RGAI	ReGister A In	Load from bus into register A (accumulator)
RGAO	ReGister A Out	Put content of register A (accumulator) onto the bus
RGBI	ReGister B In	Load from bus into register B
RGOI	ReGister Output In	Load from bus into register Output
RGIO	ReGister Input Out	Put content of input onto the bus
RAMI	Random Access Memory In	Load from bus into memory at address pointed by the MAR
RAMO	Random Access Memory Out	Put memory content at address pointed by the MAR onto the bus
ALUO	Arithmetic Logic Unit Out	Put sum result of ALU onto the bus
SUBT	SUBTtract	Invert and increment second input of ALU in order to subtract B from A
PGCI	ProGram Counter In	Load from bus into PC
PGCO	ProGram Counter Out	Put content of PC onto the bus
PGCC	ProGram Counter Count	Increment PC