

Gameboy CPU (LR35902) instruction set

	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	xA	xB	xC	xD	xE	xF	
0x	NOP 1 4 ---	LD BC,d16 3 12 ---	LD (BC),A 1 8 ---	INC BC 1 8 ---	INC B 1 4 Z 0 H -	DEC B 1 4 Z 1 H -	LD B,d8 2 8 ---	RLCA 1 4 0 0 0 C	LD (a16),SP 3 20 ---	ADD HL,BC 1 8 - 0 H C	LD A,(BC) 1 8 ---	DEC BC 1 8 ---	INC C 1 4 Z 0 H -	DEC C 1 4 Z 1 H -	LD C,d8 2 8 ---	RRCA 1 4 0 0 0 C	
1x	STOP 0 2 4 ---	LD DE,d16 3 12 ---	LD (DE),A 1 8 ---	INC DE 1 8 ---	INC D 1 4 Z 0 H -	DEC D 1 4 Z 1 H -	LD D,d8 2 8 0 0 0 C	RLA 1 4 ---	JR r8 2 12 0 H C	ADD HL,DE 1 8 - 0 H C	LD A,(DE) 1 8 ---	DEC DE 1 8 ---	INC E 1 4 Z 0 H -	DEC E 1 4 Z 1 H -	LD E,d8 2 8 ---	RRA 1 4 0 0 0 C	
2x	JR NZ,r8 2 12/8 ---	LD HL,d16 3 12 ---	LD (HL+),A 1 8 ---	INC HL 1 4 Z 0 H -	INC H 1 4 Z 1 H -	DEC H 1 4 Z 0 H -	LD H,d8 2 8 Z - 0 C	DAA 1 4 ---	JR Z,r8 2 12/8 - 0 H C	ADD HL,HL 1 8 - 0 H C	LD A,(HL+) 1 8 ---	DEC HL 1 8 ---	INC L 1 4 Z 0 H -	DEC L 1 4 Z 1 H -	LD L,d8 2 8 ---	CPL 1 4 - 1 1 -	
3x	JR NC,r8 2 12/8 ---	LD SP,d16 3 12 ---	LD (HL-),A 1 8 ---	INC SP 1 8 Z 0 H -	INC (HL) 1 12 Z 1 H -	DEC (HL) 1 12 Z 1 H -	LD (HL),d8 2 12 - 0 0 1	SCF 1 4 ---	JR C,r8 2 12/8 - 0 H C	ADD HL,SP 1 8 - 0 H C	LD A,(HL-) 1 8 ---	DEC SP 1 8 ---	INC A 1 4 Z 0 H -	DEC A 1 4 Z 1 H -	LD A,d8 2 8 -	CCF 1 4 - 0 0 C	
4x	LD B,B 1 4 ---	LD B,C 1 4 ---	LD B,D 1 4 ---	LD B,E 1 4 ---	LD B,H 1 4 ---	LD B,L 1 4 ---	LD B,(HL) 1 8 ---	LD B,A 1 4 ---	LD C,B 1 4 ---	LD C,C 1 4 ---	LD C,D 1 4 ---	LD C,E 1 4 ---	LD C,H 1 4 ---	LD C,L 1 4 ---	LD C,(HL) 1 8 ---	LD C,A 1 4 ---	
5x	LD D,B 1 4 ---	LD D,C 1 4 ---	LD D,D 1 4 ---	LD D,E 1 4 ---	LD D,H 1 4 ---	LD D,L 1 4 ---	LD D,(HL) 1 8 ---	LD D,A 1 4 ---	LD E,B 1 4 ---	LD E,C 1 4 ---	LD E,D 1 4 ---	LD E,E 1 4 ---	LD E,H 1 4 ---	LD E,L 1 4 ---	LD E,(HL) 1 8 ---	LD E,A 1 4 ---	
6x	LD H,B 1 4 ---	LD H,C 1 4 ---	LD H,D 1 4 ---	LD H,E 1 4 ---	LD H,H 1 4 ---	LD H,L 1 8 ---	LD H,(HL) 1 8 ---	LD H,A 1 4 ---	LD L,B 1 4 ---	LD L,C 1 4 ---	LD L,D 1 4 ---	LD L,E 1 4 ---	LD L,H 1 4 ---	LD L,L 1 4 ---	LD L,(HL) 1 8 ---	LD L,A 1 4 ---	
7x	LD (HL),B 1 8 ---	LD (HL),C 1 8 ---	LD (HL),D 1 8 ---	LD (HL),E 1 8 ---	LD (HL),H 1 8 ---	HALT ---	LD (HL),A 1 4 ---	LD A,B 1 8 ---	LD A,C 1 4 ---	LD A,D 1 4 ---	LD A,E 1 4 ---	LD A,H 1 4 ---	LD A,L 1 4 ---	LD A,(HL) 1 8 ---	LD A,A 1 4 ---		
8x	ADD A,B 1 4 Z 0 H C ---	ADD A,C 1 4 Z 0 H C ---	ADD A,D 1 4 Z 0 H C ---	ADD A,E 1 4 Z 0 H C ---	ADD A,H 1 4 Z 0 H C ---	ADD A,L 1 4 Z 0 H C ---	ADD A,(HL) 1 8 Z 0 H C ---	ADD A,A 1 4 Z 0 H C ---	ADC A,B 1 4 Z 0 H C ---	ADC A,C 1 4 Z 0 H C ---	ADC A,D 1 4 Z 0 H C ---	ADC A,E 1 4 Z 0 H C ---	ADC A,H 1 4 Z 0 H C ---	ADC A,L 1 4 Z 0 H C ---	ADC A,(HL) 1 8 Z 0 H C ---	ADC A,A 1 4 Z 0 H C ---	
9x	SUB B 1 4 Z 1 H C ---	SUB C 1 4 Z 1 H C ---	SUB D 1 4 Z 1 H C ---	SUB E 1 4 Z 1 H C ---	SUB H 1 4 Z 1 H C ---	SUB L 1 4 Z 1 H C ---	SUB (HL) 1 8 Z 1 H C ---	SUB A 1 4 Z 1 H C ---	SBC A,B 1 4 Z 1 H C ---	SBC A,C 1 4 Z 1 H C ---	SBC A,D 1 4 Z 1 H C ---	SBC A,E 1 4 Z 1 H C ---	SBC A,H 1 4 Z 1 H C ---	SBC A,L 1 4 Z 1 H C ---	SBC A,(HL) 1 8 Z 1 H C ---	SBC A,A 1 4 Z 1 H C ---	
Ax	AND B 1 4 Z 0 1 0 ---	AND C 1 4 Z 0 1 0 ---	AND D 1 4 Z 0 1 0 ---	AND E 1 4 Z 0 1 0 ---	AND H 1 4 Z 0 1 0 ---	AND L 1 4 Z 0 1 0 ---	AND (HL) 1 8 Z 0 1 0 ---	AND A 1 4 Z 0 0 0 ---	XOR B 1 4 Z 0 0 0 ---	XOR C 1 4 Z 0 0 0 ---	XOR D 1 4 Z 0 0 0 ---	XOR E 1 4 Z 0 0 0 ---	XOR H 1 4 Z 0 0 0 ---	XOR L 1 4 Z 0 0 0 ---	XOR (HL) 1 8 Z 0 0 0 ---	XOR A 1 4 Z 0 0 0 ---	
Bx	OR B 1 4 Z 0 0 0 ---	OR C 1 4 Z 0 0 0 ---	OR D 1 4 Z 0 0 0 ---	OR E 1 4 Z 0 0 0 ---	OR H 1 4 Z 0 0 0 ---	OR L 1 4 Z 0 0 0 ---	OR (HL) 1 8 Z 0 0 0 ---	OR A 1 4 Z 1 H C ---	CP B 1 4 Z 1 H C ---	CP C 1 4 Z 1 H C ---	CP D 1 4 Z 1 H C ---	CP E 1 4 Z 1 H C ---	CP H 1 4 Z 1 H C ---	CP L 1 4 Z 1 H C ---	CP (HL) 1 8 Z 1 H C ---	CP A 1 4 Z 1 H C ---	
Cx	RET NZ 1 20/8 ---	POP BC 1 12 ---	JPNZ,a16 3 16/12 ---	JPa16 3 16 ---	CALL NZ,a16 3 24/12 ---	PUSH BC 1 16 Z 0 H C ---	ADD A,d8 2 8 Z 0 H C ---	RST 00H 2 8 Z 0 H C ---	RET Z 1 16 1 20/8 ---	RET 1 16 1 20/8 ---	RET 1 16 1 20/8 ---	RETI 1 16 1 20/8 ---	JP Z,a16 3 16/12 1 4 ---	PREFIX CB 1 4 ---	CALL Z,a16 3 24/12 ---	CALL a16 3 24 ---	ADC A,d8 2 8 Z 0 H C ---
Dx	RET NC 1 20/8 ---	POP DE 1 12 ---	JPNCA16 3 16/12 ---		CALL NC,a16 3 24/12 ---	PUSH DE 1 16 Z 1 H C ---	SUB d8 2 8 Z 1 H C ---	RST 10H 2 8 Z 1 H C ---	RET C 1 16 1 20/8 ---	RET C 1 16 1 20/8 ---	RETI 1 16 1 20/8 ---	JP C,a16 3 16/12 1 4 ---		CALL C,a16 3 24/12 ---		SBC A,d8 2 8 Z 1 H C ---	
Ex	LDH A,(a8),A 2 12 ---	POP HL 1 12 ---	LD (C),A 2 8 ---			PUSH HL 1 16 Z 0 1 0 ---	AND d8 2 8 Z 0 1 0 ---	RST 20H 2 8 Z 0 1 0 ---	ADD SP,r8 2 16 0 0 H C ---	JP (HL) 2 16 1 4 ---	LD A,(a16),A 3 16 1 4 ---				XOR d8 2 8 Z 0 0 0 ---	RST 28H 1 16 Z 0 0 0 ---	
Fx	LDH A,(a8) 2 12 ---	POP AF 1 12 Z N H C ---	LD A,(C) 2 8 ---	DI 1 4 ---		PUSH AF 1 16 Z 0 0 0 ---	OR d8 2 8 Z 0 0 0 ---	RST 30H 1 16 Z 0 0 0 ---	LD HL,SP+r8 2 12 0 0 H C ---	LD SP,HL 1 8 ---	LD A,(a16) 3 16 1 4 ---	EI 1 4 ---			CP d8 2 8 Z 1 H C ---	RST 38H 1 16 Z 1 H C ---	

Prefix CB

	x0	x1	x2	x3	x4	x5	x6	x7	x8	x9	xA	xB	xC	xD	xE	xF
0x	RLC B 2 8 Z 0 0 C ---	RLC C 2 8 Z 0 0 C ---	RLC D 2 8 Z 0 0 C ---	RLC E 2 8 Z 0 0 C ---	RLC H 2 8 Z 0 0 C ---	RLC L 2 8 Z 0 0 C ---	RLC (HL) 2 8 Z 0 0 C ---	RLC A 2 8 Z 0 0 C ---	RRC B 2 8 Z 0 0 C ---	RRC C 2 8 Z 0 0 C ---	RRC D 2 8 Z 0 0 C ---	RRC E 2 8 Z 0 0 C ---	RRC H 2 8 Z 0 0 C ---	RRC L 2 8 Z 0 0 C ---	RRC (HL) 2 8 Z 0 0 C ---	RRC A 2 8 Z 0 0 C ---
1x	RL B 2 8 Z 0 0 C ---	RL C 2 8 Z 0 0 C ---	RL D 2 8 Z 0 0 C ---	RL E 2 8 Z 0 0 C ---	RL H 2 8 Z 0 0 C ---	RL L 2 8 Z 0 0 C ---	RL (HL) 2 8 Z 0 0 C ---	RL A 2 8 Z 0 0 C ---	RR B 2 8 Z 0 0 C ---	RR C 2 8 Z 0 0 C ---	RR D 2 8 Z 0 0 C ---	RR E 2 8 Z 0 0 C ---	RR H 2 8 Z 0 0 C ---	RR L 2 8 Z 0 0 C ---	RR (HL) 2 8 Z 0 0 C ---	RR A 2 8 Z 0 0 C ---
2x	SLA B 2 8 Z 0 0 C ---	SLA C 2 8 Z 0 0 C ---	SLA D 2 8 Z 0 0 C ---	SLA E 2 8 Z 0 0 C ---	SLA H 2 8 Z 0 0 C ---	SLA L 2 8 Z 0 0 C ---	SLA (HL) 2 8 Z 0 0 C ---	SLA A 2 8 Z 0 0 C ---	SRA B 2 8 Z 0 0 C ---	SRA C 2 8 Z 0 0 C ---	SRA D 2 8 Z 0 0 C ---	SRA E 2 8 Z 0 0 C ---	SRA H 2 8 Z 0 0 C ---	SRA L 2 8 Z 0 0 C ---	SRA (HL) 2 8 Z 0 0 C ---	SRA A 2 8 Z 0 0 C ---

3x	SWAP B 2 8 Z 0 0 0	SWAP C 2 8 Z 0 0 0	SWAP D 2 8 Z 0 0 0	SWAP E 2 8 Z 0 0 0	SWAP H 2 8 Z 0 0 0	SWAP L 2 8 Z 0 0 0	SWAP (HL) 2 16 Z 0 0 0	SWAP A 2 8 Z 0 0 0	SRL B 2 8 Z 0 0 C	SRL C 2 8 Z 0 0 C	SRL D 2 8 Z 0 0 C	SRL E 2 8 Z 0 0 C	SRL H 2 8 Z 0 0 C	SRL L 2 8 Z 0 0 C	SRL (HL) 2 16 Z 0 0 C	SRL A 2 8 Z 0 0 C
4x	BIT 0,B 2 8 Z 0 1 -	BIT 0,C 2 8 Z 0 1 -	BIT 0,D 2 8 Z 0 1 -	BIT 0,E 2 8 Z 0 1 -	BIT 0,H 2 8 Z 0 1 -	BIT 0,L 2 8 Z 0 1 -	BIT 0,(HL) 2 16 Z 0 1 -	BIT 0,A 2 8 Z 0 1 -	BIT 1,B 2 8 Z 0 1 -	BIT 1,C 2 8 Z 0 1 -	BIT 1,D 2 8 Z 0 1 -	BIT 1,E 2 8 Z 0 1 -	BIT 1,H 2 8 Z 0 1 -	BIT 1,L 2 8 Z 0 1 -	BIT 1,(HL) 2 16 Z 0 1 -	BIT 1,A 2 8 Z 0 1 -
5x	BIT 2,B 2 8 Z 0 1 -	BIT 2,C 2 8 Z 0 1 -	BIT 2,D 2 8 Z 0 1 -	BIT 2,E 2 8 Z 0 1 -	BIT 2,H 2 8 Z 0 1 -	BIT 2,L 2 8 Z 0 1 -	BIT 2,(HL) 2 16 Z 0 1 -	BIT 2,A 2 8 Z 0 1 -	BIT 3,B 2 8 Z 0 1 -	BIT 3,C 2 8 Z 0 1 -	BIT 3,D 2 8 Z 0 1 -	BIT 3,E 2 8 Z 0 1 -	BIT 3,H 2 8 Z 0 1 -	BIT 3,L 2 8 Z 0 1 -	BIT 3,(HL) 2 16 Z 0 1 -	BIT 3,A 2 8 Z 0 1 -
6x	BIT 4,B 2 8 Z 0 1 -	BIT 4,C 2 8 Z 0 1 -	BIT 4,D 2 8 Z 0 1 -	BIT 4,E 2 8 Z 0 1 -	BIT 4,H 2 8 Z 0 1 -	BIT 4,L 2 8 Z 0 1 -	BIT 4,(HL) 2 16 Z 0 1 -	BIT 4,A 2 8 Z 0 1 -	BIT 5,B 2 8 Z 0 1 -	BIT 5,C 2 8 Z 0 1 -	BIT 5,D 2 8 Z 0 1 -	BIT 5,E 2 8 Z 0 1 -	BIT 5,H 2 8 Z 0 1 -	BIT 5,L 2 8 Z 0 1 -	BIT 5,(HL) 2 16 Z 0 1 -	BIT 5,A 2 8 Z 0 1 -
7x	BIT 6,B 2 8 Z 0 1 -	BIT 6,C 2 8 Z 0 1 -	BIT 6,D 2 8 Z 0 1 -	BIT 6,E 2 8 Z 0 1 -	BIT 6,H 2 8 Z 0 1 -	BIT 6,L 2 8 Z 0 1 -	BIT 6,(HL) 2 16 Z 0 1 -	BIT 6,A 2 8 Z 0 1 -	BIT 7,B 2 8 Z 0 1 -	BIT 7,C 2 8 Z 0 1 -	BIT 7,D 2 8 Z 0 1 -	BIT 7,E 2 8 Z 0 1 -	BIT 7,H 2 8 Z 0 1 -	BIT 7,L 2 8 Z 0 1 -	BIT 7,(HL) 2 16 Z 0 1 -	BIT 7,A 2 8 Z 0 1 -
8x	RES 0,B 2 8 - - -	RES 0,C 2 8 - - -	RES 0,D 2 8 - - -	RES 0,E 2 8 - - -	RES 0,H 2 8 - - -	RES 0,L 2 8 - - -	RES 0,(HL) 2 16 - - -	RES 0,A 2 8 - - -	RES 1,B 2 8 - - -	RES 1,C 2 8 - - -	RES 1,D 2 8 - - -	RES 1,E 2 8 - - -	RES 1,H 2 8 - - -	RES 1,L 2 8 - - -	RES 1,(HL) 2 16 - - -	RES 1,A 2 8 - - -
9x	RES 2,B 2 8 - - -	RES 2,C 2 8 - - -	RES 2,D 2 8 - - -	RES 2,E 2 8 - - -	RES 2,H 2 8 - - -	RES 2,L 2 8 - - -	RES 2,(HL) 2 16 - - -	RES 2,A 2 8 - - -	RES 3,B 2 8 - - -	RES 3,C 2 8 - - -	RES 3,D 2 8 - - -	RES 3,E 2 8 - - -	RES 3,H 2 8 - - -	RES 3,L 2 8 - - -	RES 3,(HL) 2 16 - - -	RES 3,A 2 8 - - -
Ax	RES 4,B 2 8 - - -	RES 4,C 2 8 - - -	RES 4,D 2 8 - - -	RES 4,E 2 8 - - -	RES 4,H 2 8 - - -	RES 4,L 2 8 - - -	RES 4,(HL) 2 16 - - -	RES 4,A 2 8 - - -	RES 5,B 2 8 - - -	RES 5,C 2 8 - - -	RES 5,D 2 8 - - -	RES 5,E 2 8 - - -	RES 5,H 2 8 - - -	RES 5,L 2 8 - - -	RES 5,(HL) 2 16 - - -	RES 5,A 2 8 - - -
Bx	RES 6,B 2 8 - - -	RES 6,C 2 8 - - -	RES 6,D 2 8 - - -	RES 6,E 2 8 - - -	RES 6,H 2 8 - - -	RES 6,L 2 8 - - -	RES 6,(HL) 2 16 - - -	RES 6,A 2 8 - - -	RES 7,B 2 8 - - -	RES 7,C 2 8 - - -	RES 7,D 2 8 - - -	RES 7,E 2 8 - - -	RES 7,H 2 8 - - -	RES 7,L 2 8 - - -	RES 7,(HL) 2 16 - - -	RES 7,A 2 8 - - -
Cx	SET 0,B 2 8 - - -	SET 0,C 2 8 - - -	SET 0,D 2 8 - - -	SET 0,E 2 8 - - -	SET 0,H 2 8 - - -	SET 0,L 2 8 - - -	SET 0,(HL) 2 16 - - -	SET 0,A 2 8 - - -	SET 1,B 2 8 - - -	SET 1,C 2 8 - - -	SET 1,D 2 8 - - -	SET 1,E 2 8 - - -	SET 1,H 2 8 - - -	SET 1,L 2 8 - - -	SET 1,(HL) 2 16 - - -	SET 1,A 2 8 - - -
Dx	SET 2,B 2 8 - - -	SET 2,C 2 8 - - -	SET 2,D 2 8 - - -	SET 2,E 2 8 - - -	SET 2,H 2 8 - - -	SET 2,L 2 8 - - -	SET 2,(HL) 2 16 - - -	SET 2,A 2 8 - - -	SET 3,B 2 8 - - -	SET 3,C 2 8 - - -	SET 3,D 2 8 - - -	SET 3,E 2 8 - - -	SET 3,H 2 8 - - -	SET 3,L 2 8 - - -	SET 3,(HL) 2 16 - - -	SET 3,A 2 8 - - -
Ex	SET 4,B 2 8 - - -	SET 4,C 2 8 - - -	SET 4,D 2 8 - - -	SET 4,E 2 8 - - -	SET 4,H 2 8 - - -	SET 4,L 2 8 - - -	SET 4,(HL) 2 16 - - -	SET 4,A 2 8 - - -	SET 5,B 2 8 - - -	SET 5,C 2 8 - - -	SET 5,D 2 8 - - -	SET 5,E 2 8 - - -	SET 5,H 2 8 - - -	SET 5,L 2 8 - - -	SET 5,(HL) 2 16 - - -	SET 5,A 2 8 - - -
Fx	SET 6,B 2 8 - - -	SET 6,C 2 8 - - -	SET 6,D 2 8 - - -	SET 6,E 2 8 - - -	SET 6,H 2 8 - - -	SET 6,L 2 8 - - -	SET 6,(HL) 2 16 - - -	SET 6,A 2 8 - - -	SET 7,B 2 8 - - -	SET 7,C 2 8 - - -	SET 7,D 2 8 - - -	SET 7,E 2 8 - - -	SET 7,H 2 8 - - -	SET 7,L 2 8 - - -	SET 7,(HL) 2 16 - - -	SET 7,A 2 8 - - -

Misc/control instructions
 Jumps/calls
 8bit load/store/move instructions
 16bit load/store/move instructions
 8bit arithmetic/logical instructions
 16bit arithmetic/logical instructions
 8bit rotationsshifts and bit instructions

Length in bytes → INS reg
2 8
Z N H C ← Instruction mnemonic
 ← Duration in cycles
 ← Flags affected

Duration of conditional calls and returns is different when action is taken or not. This is indicated by two numbers separated by "/". The higher number (on the left side of "/") means duration of instruction when action is taken, the lower number (on the right side of "/") means duration of instruction when action is not taken.

Instruction STOP has according to manuals opcode **10 00** and thus is 2 bytes long. Anyhow it seems there is no reason for it so some assemblers code it simply as one byte instruction **10**. Flags affected are always shown in Z H N C order. If flag is marked by "0" it means it is reset after the instruction. If it is marked by "1" it is set. If it is marked by "-" it is not changed. If it is marked by "Z", "N", "H" or "C" corresponding flag is affected as expected by its function.

d8 means immediate 8 bit data
 d16 means immediate 16 bit data
 a8 means 8 bit unsigned data, which are added to \$FF00 in certain instructions (replacement for missing IN and OUT instructions)
 a16 means 16 bit address
 r8 means 8 bit signed data, which are added to program counter

LD A,(C) has alternative mnemonic LD A,(\$FF00+C)
 LD C,(A) has alternative mnemonic LD (\$FF00+C),A
 LDH A,(a8) has alternative mnemonic LD A,(\$FF00+a8)
 LDH (a8),A has alternative mnemonic LD (\$FF00+a8),A
 LD A,(HL+) has alternative mnemonic LD A,(HLI) or LDI A,(HL)
 LD (HL+),A has alternative mnemonic LD (HLI),A or LDI (HL),A
 LD A,(HL-) has alternative mnemonic LD A,(HLD) or LDD A,(HL)
 LD (HL-),A has alternative mnemonic LD (HLD),A or LDD (HL),A
 LD HL,SP+r8 has alternative mnemonic LDHL SP,r8

Registers

15 . . . 8	7 . . . 0
A (accumulator)	F (flags)
B	C
D	E
H	L

15 . . . 0
SP (stack pointer)
PC (program counter)

Flag register (F) bits:

7	6	5	4	3	2	1	0
Z	N	H	C	0	0	0	0

Z - Zero Flag

N - Subtract Flag

H - Half Carry Flag

C - Carry Flag

0 - Not used, always zero