Instruction	Action	Opcode	Clk	Rising Edge	Falling Edge	Control Signals	Select Signals
Fetch	fetch instruction from memory		1	put address to read from into bus from PC	put address into MR; increment PC	Epc,Lmr,Ipc	
			2	read opcode from memory to bus	load opcode to IR; decode to MS	RD,Lir,Lms	
nop	does literally nothing	00	3			End	
adi xx	add immediate	01	3	put address to read from into bus from PC	put address into MR; increment PC	Epc,Lmr,Ipc	
			4	read value from memory to bus	load value from bus to OR	RD,Lor	
			5	put previous AR and OR values in ALU	put output of ALU in AR	Eor,Ear,Lar,End	Salu->ADD
sbi xx	subtract immediate	02	3	put address to read from into bus from PC	put address into MR; increment PC	Epc,Lmr,Ipc	
			4	read value from memory to bus	load value from bus to OR	RD,Lor	
			5	put previous AR and OR values in ALU	put output of ALU in AR	Eor,Ear,Lar,End	Salu->SUB
xri xx	xor immediate	03	3	put address to read from into bus from PC	put address into MR; increment PC	Epc,Lmr,Ipc	
			4	read value from memory to bus	load value from bus to OR	RD,Lor	
			5	put previous AR and OR values in ALU	put output of ALU in AR	Eor,Ear,Lar,End	Salu->XOR
ani xx	bitwise add immediate	04	3	put address to read from into bus from PC	put address into MR; increment PC	Epc,Lmr,Ipc	
			4	read value from memory to bus	load value from bus to OR	RD,Lor	
			5	put previous AR and OR values in ALU	put output of ALU in AR	Eor,Ear,Lar,End	Salu->AND
ori xx	bitwise or immediate	05	3	put address to read from into bus from PC	put address into MR; increment PC	Epc,Lmr,Ipc	
			4	read value from memory to bus	load value from bus to OR	RD,Lor	
			5	put previous AR and OR values in ALU	put output of ALU in AR	Eor,Ear,Lar,End	Salu->OR
cmi xx	compare immediate	06	3	put address to read from into bus from PC	put address into MR; increment PC	Epc,Lmr,Ipc	
			4	read value from memory to bus	load value from bus to OR	RD,Lor	
			5	put previous AR and OR values in ALU		Eor,Ear,End	Salu->CMP
stop	shuts down the processor	07	3			End,StopClock	
ret<FL>	returns to address on top of stack if flag is true	08-0F	3	if <FL> is 0, skip 4 and 5		Efl,End if <FL>'	Sfl-><FL>
			4	put address of top of stack on the bus I.e. SP	load bus to MR; increment SP	Esp,Lmr,Isp	
			5	read address from memory to bus	load address into PC	RD,Lpc,End	
add <R>	add AR to <R>	10-1F	3	put value from <R> onto bus	load value from bus to OR	Erg,Lor	Srg-><R>
			4	put value from AR to ALU	load value from ALU to AR	Eor, Ear,Lar,End	Salu->ADD
sub <R>	subtract <R> from AR	20-2F	3	put value from <R> onto bus	load value from bus to OR	Erg,Lor	Srg-><R>
			4	put value from AR to ALU	load value from ALU to AR	Eor,Ear,Lar,End	Salu->SUB
xor <R>	xor AR with <R>	30-3F	3	put value from <R> onto bus	load value from bus to OR	Erg,Lor	Srg-><R>
			4	put value from AR to ALU	load value from ALU to AR	Eor,Ear,Lar,End	Salu->XOR
and <R>	and AR with <R>	40-4F	3	put value from <R> onto bus	load value from bus to OR	Erg,Lor	Srg-><R>
			4	put value from AR to ALU	load value from ALU to AR	Eor,Ear,Lar,End	Salu->AND

or <R>	or AR with <R>	50-5F	3	put value from <R> onto bus	load value from bus to OR	Erg,Lor	Srg-><R>
			4	put value from AR to ALU	load value from ALU to AR	Eor,Ear,Lar,End	Salu->OR
cmp <R>	compare AR with <R>	60-6F	3	put value from <R> onto bus	load value from bus to OR	Erg,Lor	Srg-><R>
			4	put value from AR to ALU		Eor,Ear,End	Salu->CMP
movs <R>	moves value from <R> to AR	70-7F	3	put values from <R> onto bus	load value from ALU to AR(<R> value is passed)	Erg,Lar,End	Srg-><R>, Salu->PASS0
movd <R>	moves value from AR to <R>	80-8F	3	put value from AR onto bus	load value from bus to <R>	Ear,Lrg,End	Srg-><R>
movi <R> xx	move value xx to <R>	90-9F	3	put address to red from into bus from PC	put address into MR; increment PC	Epc,Lmr,Ipc	
			4	read value from memory to bus	load value into <R>	RD,Lrg,End	Srg-><R>
stor <R>	writes value from <R> to memory in location given by AR	A0-AF	3	put address from AR onto bus	load address into MR	Ear,Lmr	
			4	put value from <R> onto bus	write value from bus onto memory	Erg,WR,End	Srg-><R>
load <R>	reads value from memory to <R> in location given by AR	B0-BF	3	put address from AR onto bus	load address into MR	Ear,Lmr	
			4	read value from memory to bus	load value into <R>	RD,Lrg,End	Srg-><R>
push <R>	pushes value from <R> to top of stack	C0-CF	3		decrements SP to location of top of stack	Dsp	
			4	put address of top of stack on the bus i.e. SP	load address into MR	Esp,Lmr	
			5	put value from <R> onto bus	write value from bus onto memory	Erg,WR,End	Srg-><R>
pop <R>	pops value from top of stack to <R>	D0-DF	3	put address of top of stack on the bus i.e. SP	loads address into MR; increment SP	Esp,Lmr,Isp	
			4	read value from top of stack to bus	load value from bus onto <R>	RD,Lrg,End	Srg-><R>
jumpd<FL> xx	if flag value is 1, program jumps to given address xx	E0-E7	3	if <FL> is 0, skip 4; put address from PC to bus	load address into MR; increment PC	Epc,Lmr,Ipc, Efl,End if <FL>'	Sfl-><FL>
			4	put address from memory onto bus	load address onto PC	RD,Lpc,End	
jumpr<FL>	if flag value is 1, program jumps to address in AR	E8-EF	3	if <FL> is 0, skip 4		Efl,End if <FL>'	Sfl-><FL>
			4	put address from AR onto bus	load address onto PC	Ear,Lpc,End	
cd<FL> xx	if flag value is 1, program stores current address in stack and jumps to given address xx	F0-F7	3	if <FL> is 0, skip 4,5,6,7; put address from PC to bus	load address into MR; increment PC	Epc,Lmr,Ipc, Efl,End if <FL>'	Sfl-><FL>
			4	put address from memory onto bus	load address into OR; decrement SP to location on top of stack	RD,Lor,Dsp	
			5	put address of top of stack on the bus i.e. SP	load address into MR	Esp,Lmr	
			6	put address from PC to the bus	write address from PC to the top of stack	Epc,WR	
			7	put address from OR(taken from memory) onto bus	load address onto PC	Eor,Lpc,End	
cr<FL>	if flag value is 1, program stores current address in stack and jumps to address in AR	F8-FF	3	if <FL> is 0, skip 4,5,6,7		Efl,End if <FL>'	Sfl-><FL>
			4		decrements SP to location of top of stack	Dsp	
			5	put address of top of stack on the bus i.e. SP	load address into MR	Esp,Lmr	
			6	put address from PC to the bus	write address from PC to the top of stack	Epc,WR	
			7	put address from AR onto bus	load address onto PC	Ear,Lpc,End	