

Register	Code
R0	000
R1	001
R2	010
R3	011
R4	100
R4	101
R6	110
R7	111

Register Mode	Code
Register	00
AutoInc	01
AutoDec	10
Indexed	11

Mode	Code
Direct	0
Indirect	1

*Register Mode +Mode

2 OPERANDS → IR → OPCODE (15:12) SRC (11:6) DST(5:0)

Inst	OP Code
MOV	0000
ADD	0001
ADC	0010
SUB	0011
SBC	0100
AND	0101
OR	0110
XOR	0111
CMP	1000

1 OPERANDS →

IR → OPCODE (15:6) DST (5:0)

100100+OPcode

INST	OP CODE (9:6)
INC	0000
DEC	0001
CLR	0010
INV	0011
LSR	0100
ROR	0101
ASR	0110
LSL	0111
ROL	1000

Branch INST

10100+OPCODE

INST	OP CODE
BR	000
BEQ	001
BNE	010
BLO	011
BLS	100
BHI	101
BHS	110

No OPERAND

1011+opcode+xx

INST	OPCODE
HLT	101100xxxxxxx
NOP	101101xxxxxxx

Jump Sub-Routine Instructions

1100

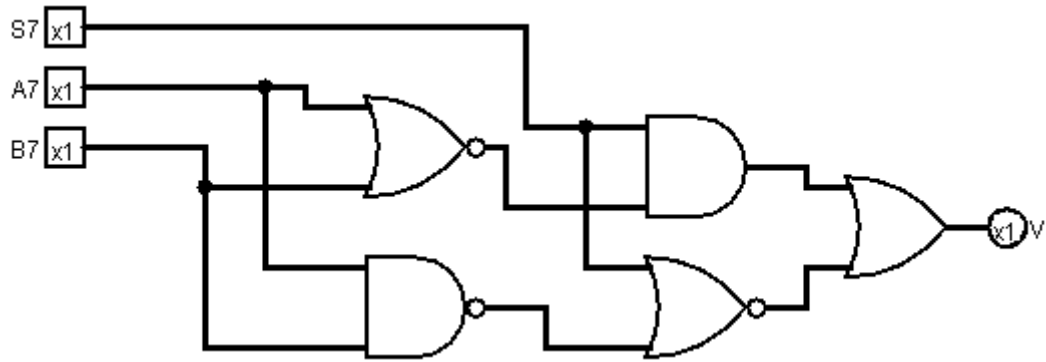
INST	
JSR	1100 00xxxx +dst
RTS	1100 01xxxxxxxxxxx
INTERRUPT	
IRET	1100 10xxxxxxxxx

F0 (8-bits)	F1 (4-bit)	F2 (3-bit)	F3(2-bit)
	0000: No transfer 0001: PCout 0010: MDR_out 0011: Z_out 0100: Rsrc_out 0101: Rdst_out 0110: TEMP_out 0111: Address_out 1000: SOURCE_OUT 1001: DEST_OUT 1010: SP_out 1011: FLAGS_out	000: No Transfer 001:Pc_in 010:IR_in 011:Z_in 100:Rsrc_in 101:Rdst_in 110: SP_in	00: No transfer 01:MAR_in 10:MDR_in 11:TEMP_in

F4 (2-bits)	F5 (4 bit)	F6 (2bit)	F7 (1bit)
00: No transfer 01: Yin 10: SOURCE_IN 11: DEST_IN	0000:ADD 0001:SUB 0010:AND 0011:OR 0100:XOR 0101:NOT 0110:LSR 0111:ROR 1000:ASR 1001:LSL 1010:ROL 1011:CLR 1100:ADC 1101:SBC	00: No Action 01:Read 10:Write	0: No Action 1:ClearY

F8 (1bits)	F9 (1 bit)	F10 (3 bit)	F11 (1bit)	F12 (1bit)	F13 (1bit)	F14 (1bit) FLAGS_CH
0: Carry_in = 0 1: Carry_in = 1	0: no action 1: flags_in	000: No Action 001: OR_dst 010: OR_indsr 011: OR_inddst 100: OR_result 101: OR_ALU 110: OR_sng/OR_JSR 111: OR_INT	0: No Action 1: PLA_out	0: No Action 1: Halt	0: No action 1: INT	0: FLAGS is loaded from ALU 1: FLAGS is loaded from BUS

Overflow flag circuit



S7	A7	B7	V
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

Zero flag -> 16-input NOR gate

Carry_out from ALU

N flag -> S15

Address decoder function

If(IR[7]) F = 1111111 & IR[7:0] & 0

Else F = 0000000 & IR[7:0] & 0