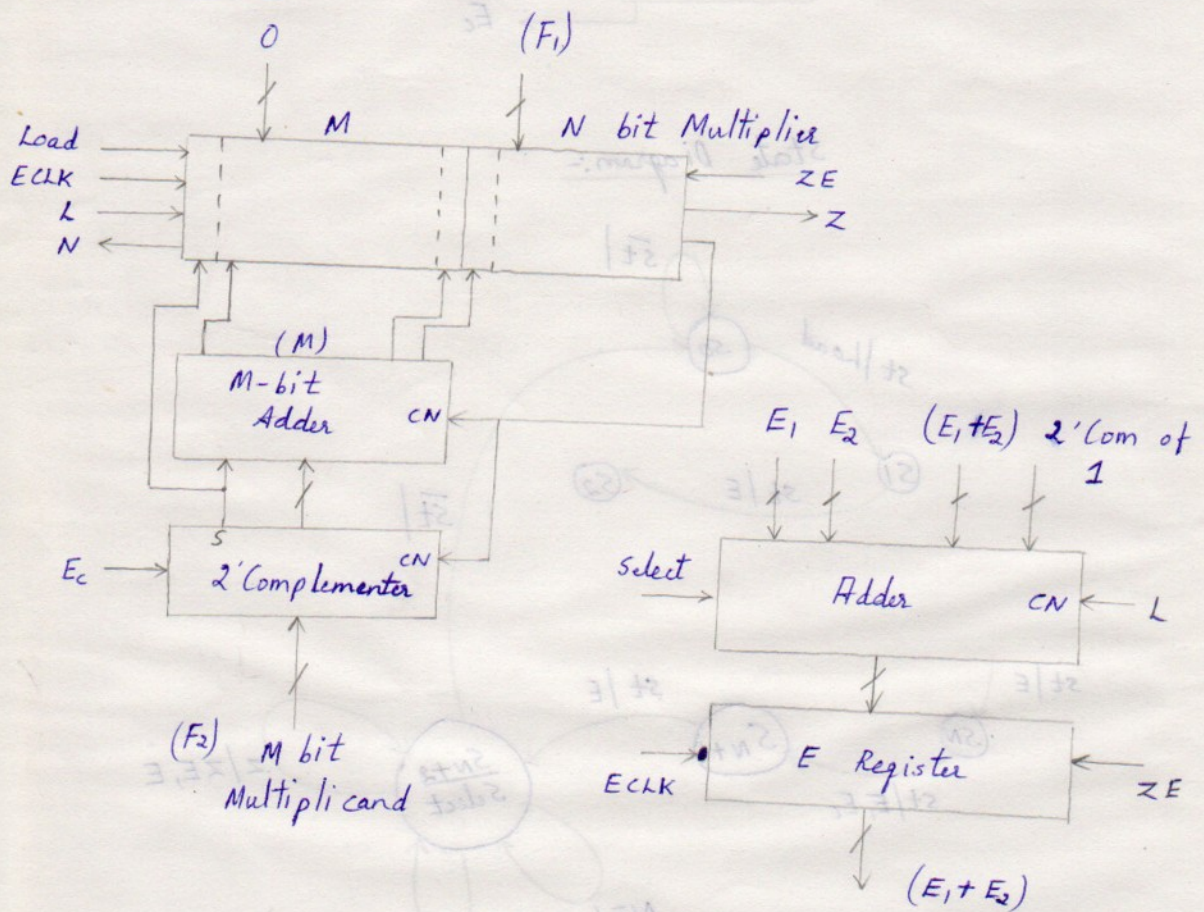


Floating Point Multiplier:

$$F \cdot 2^E = (F_1 \cdot 2^{E_1}) \cdot (F_2 \cdot 2^{E_2})$$

ALU:



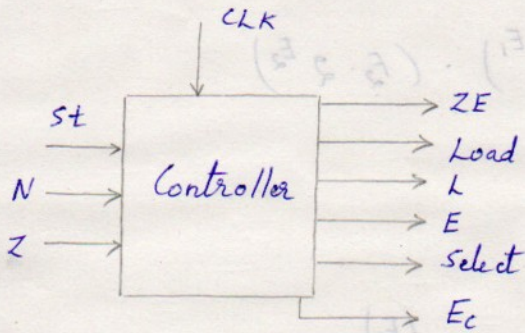
Operation of Adder:

Select	CN	o/p
0	X	$E_1 + E_2$
1	1	$E_1 + E_2 - 1$
1	0	$E_1 + E_2$

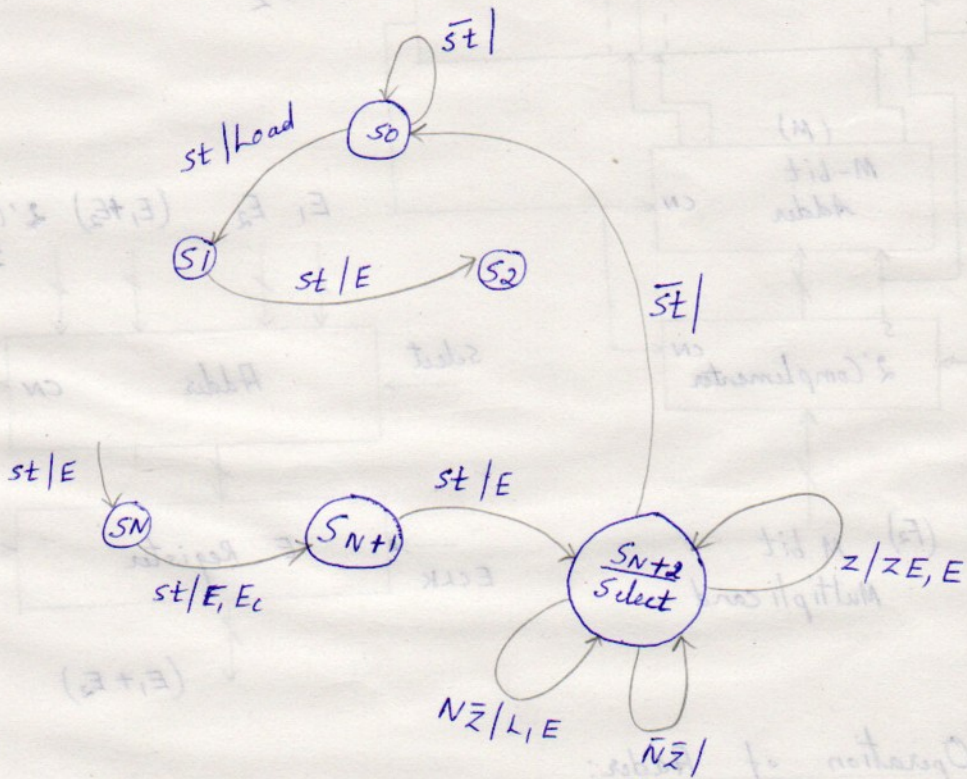
Select	Addend	Augend
0	E_2	E_1
1	2's Com of 1	$E_1 + E_2$

Note: 1) Left shift & Subtraction to be done in same CLK cycle.

Controller:-



State Diagram:-



Booth's Multiplier:

Multiplicand : M bit

Multiplier : N bit

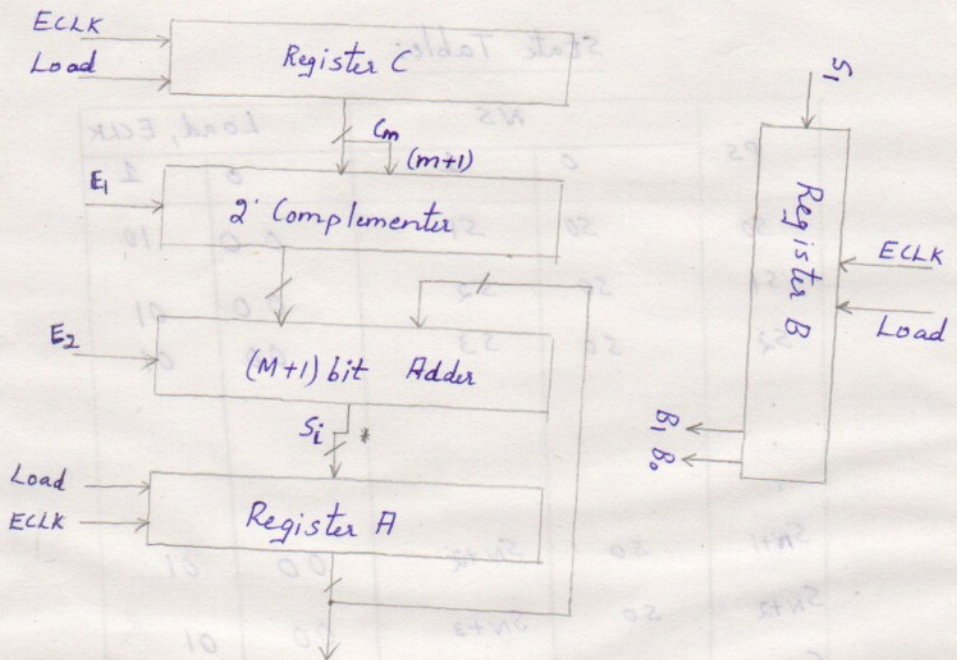
Product : $(M+N+1)$ bit

ALU:-

C : M bit Register

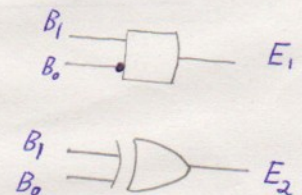
A : $(M+1)$ bit Register

B : $(N+1)$ bit Register

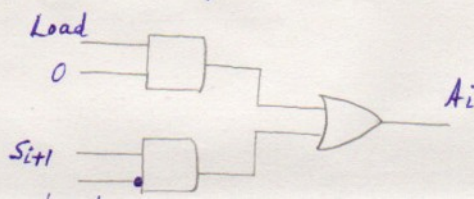


E_1	O/P
1	Complement
0	True

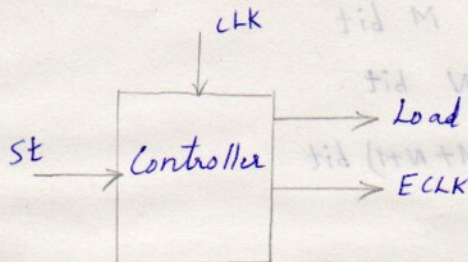
E_2	O/P
1	S_i
0	A_i



* Register A: This is configured for Right shift with sign extension.



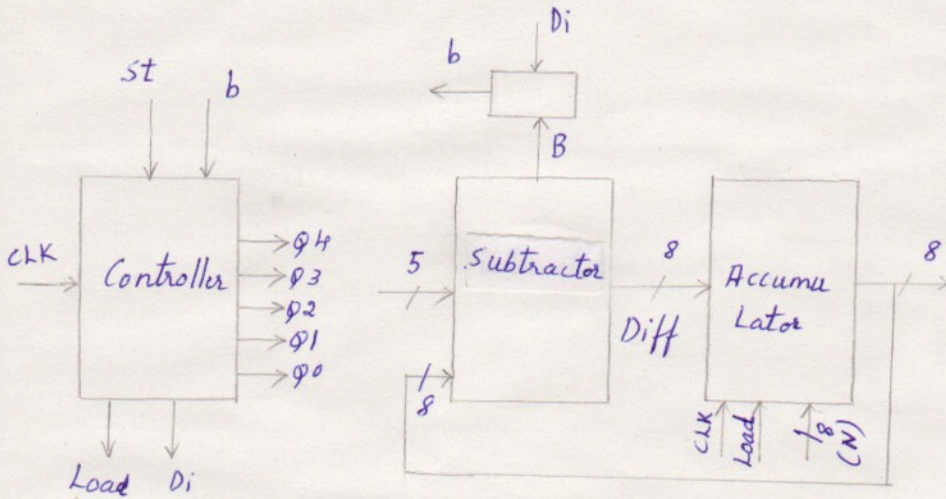
Controller:



state Table:

PS	NS		Load, ECLK	
	0	1	0	1
S0	S0	S1	00	10
S1	S0	S2	00	01
S2	S0	S3	00	01
.	.	.	.	.
SN+1	S0	SN+2	00	01
SN+2	S0	SN+3	00	01
SN+3	S0	SN+3	00	00

Square Rooter:-

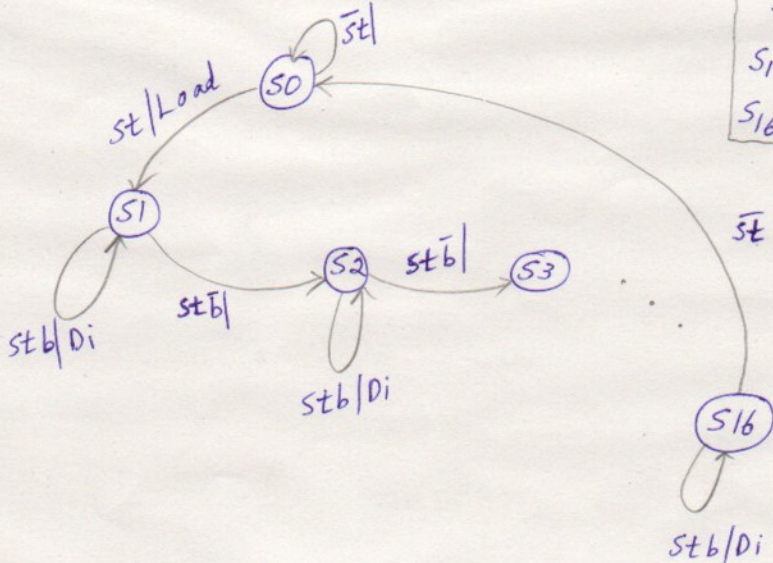


Di	b
0	8
1	1

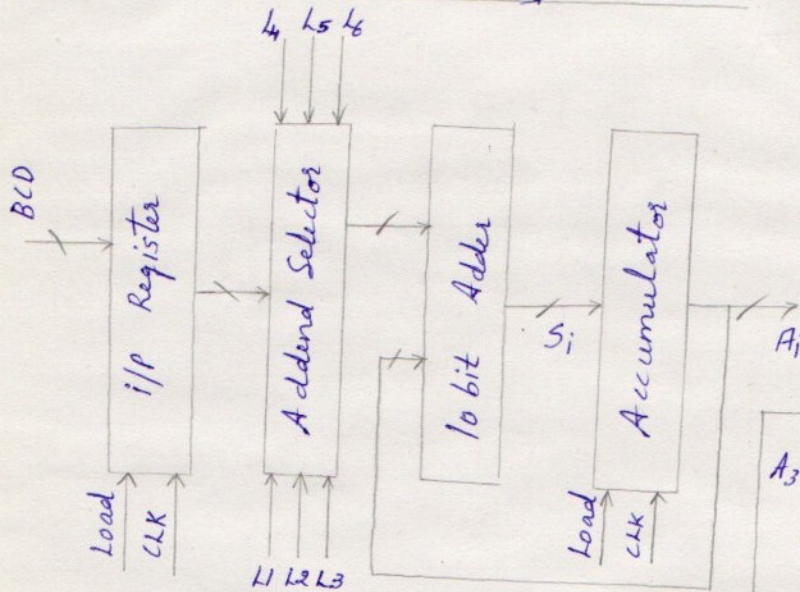
Load	Accumulator
0	Diff
1	N

	ϕ_4	ϕ_3	ϕ_2	ϕ_1	ϕ_0
S0	0	0	0	0	0
S1	0	0	0	0	1
S2	0	0	0	1	1
S3	0	0	1	0	1
...					
S15	1	1	1	0	1
S16	1	1	1	1	1

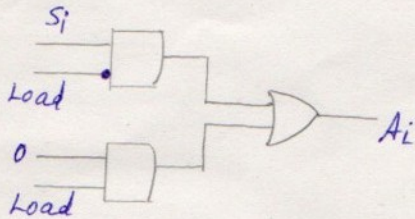
State Diagram:



BCD - Binary Converter:

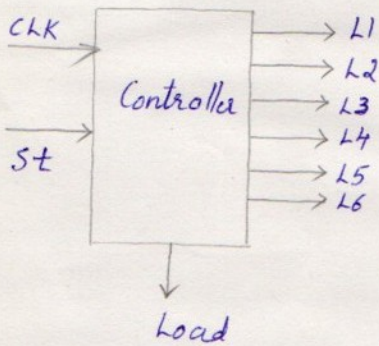


12 : Inputs
10 : Outputs

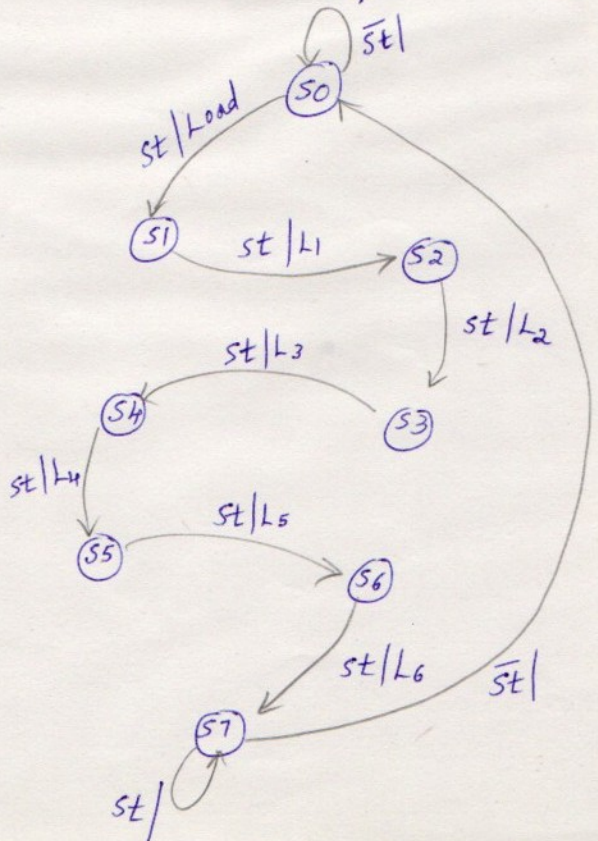


$A_3 A_2 A_1 A_0 0000 00 : L_6$
 $A_3 A_2 A_1 A_0 000 00 : L_5$
 $A_3 A_2 A_1 A_0 00 : L_4$
 $B_3 B_2 B_1 B_0 000 : L_3$
 $B_3 B_2 B_1 B_0 0 : L_2$
 $C_3 C_2 C_1 C_0 : L_1$

Controller:-



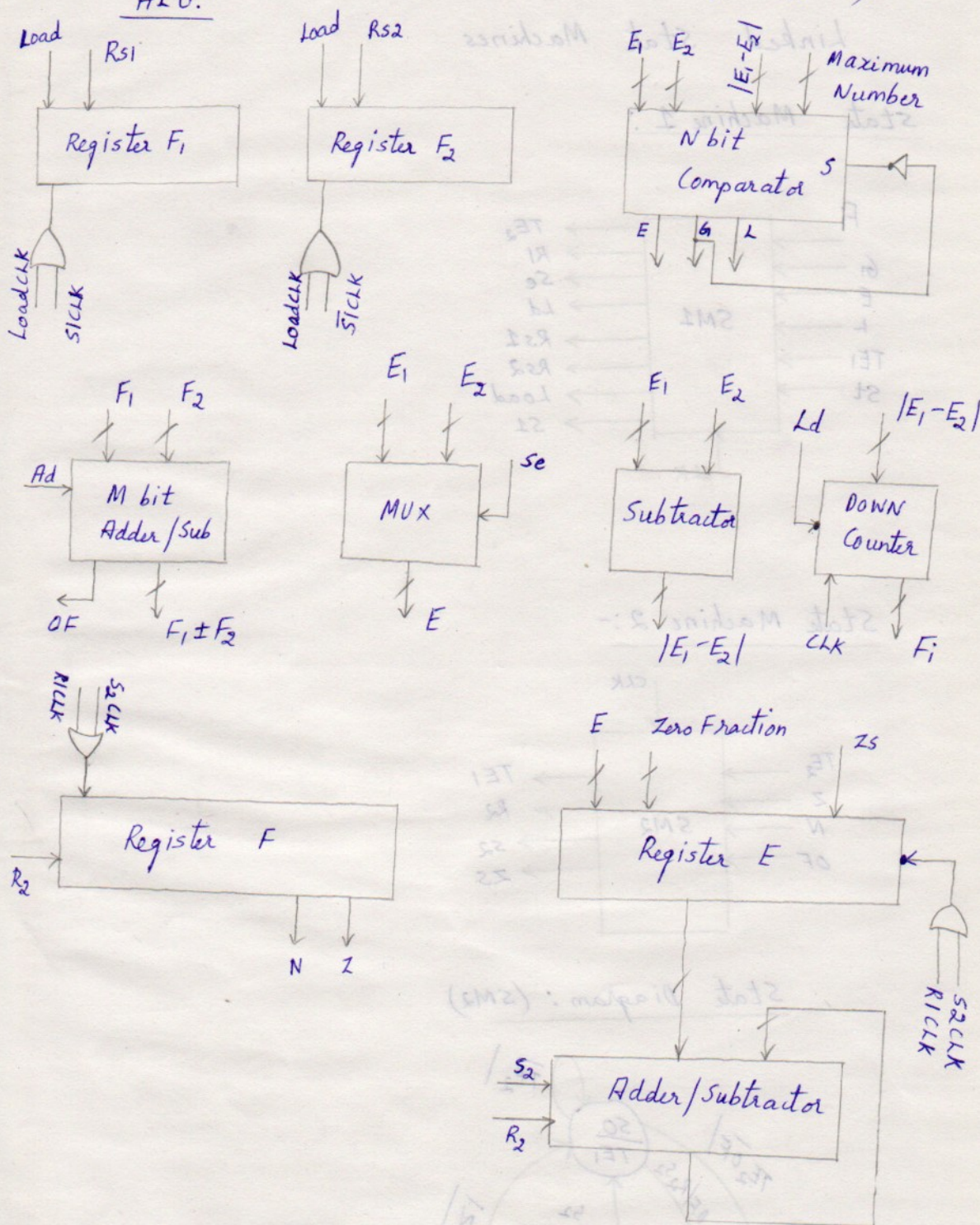
State Diagram:-



Floating Point Adder/Subtractor :

$$F \times 2^E = (F_1 \cdot 2^{E_1}) \pm (F_2 \cdot 2^{E_2})$$

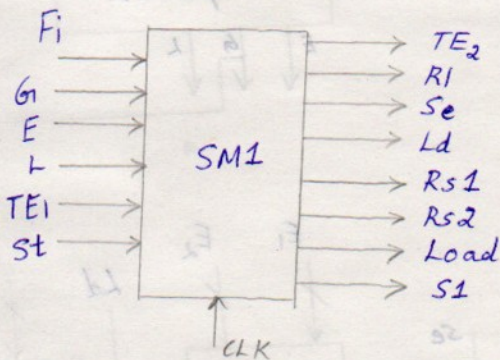
ALU:



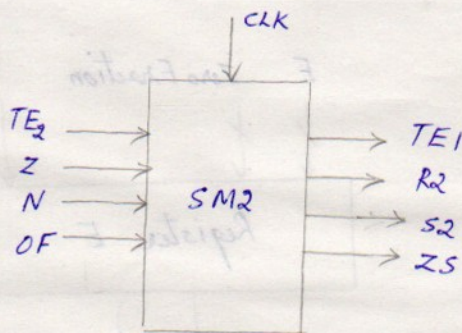
Controller:-

Linked State Machines

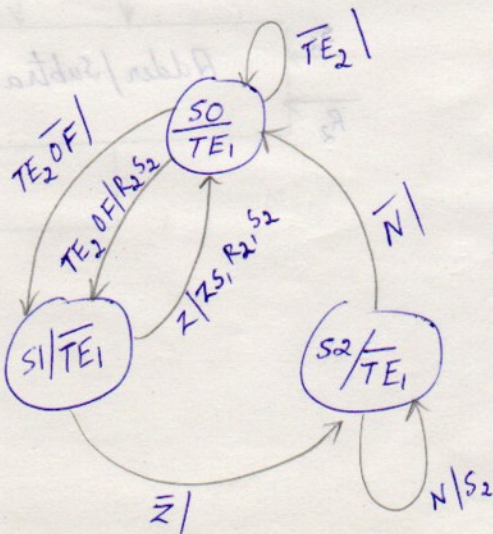
State Machine 1:



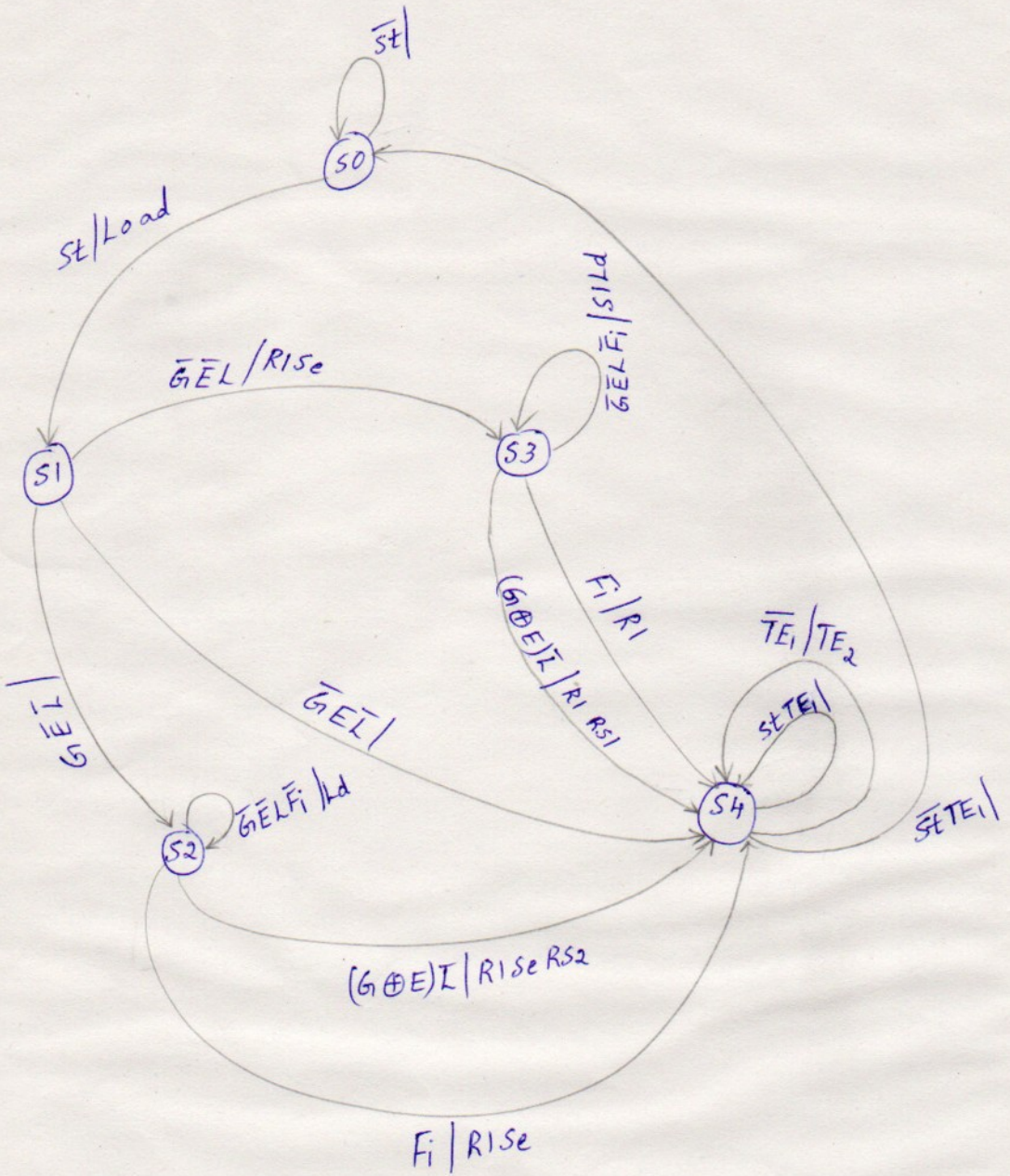
State Machine 2:-



State Diagram: (SM2)

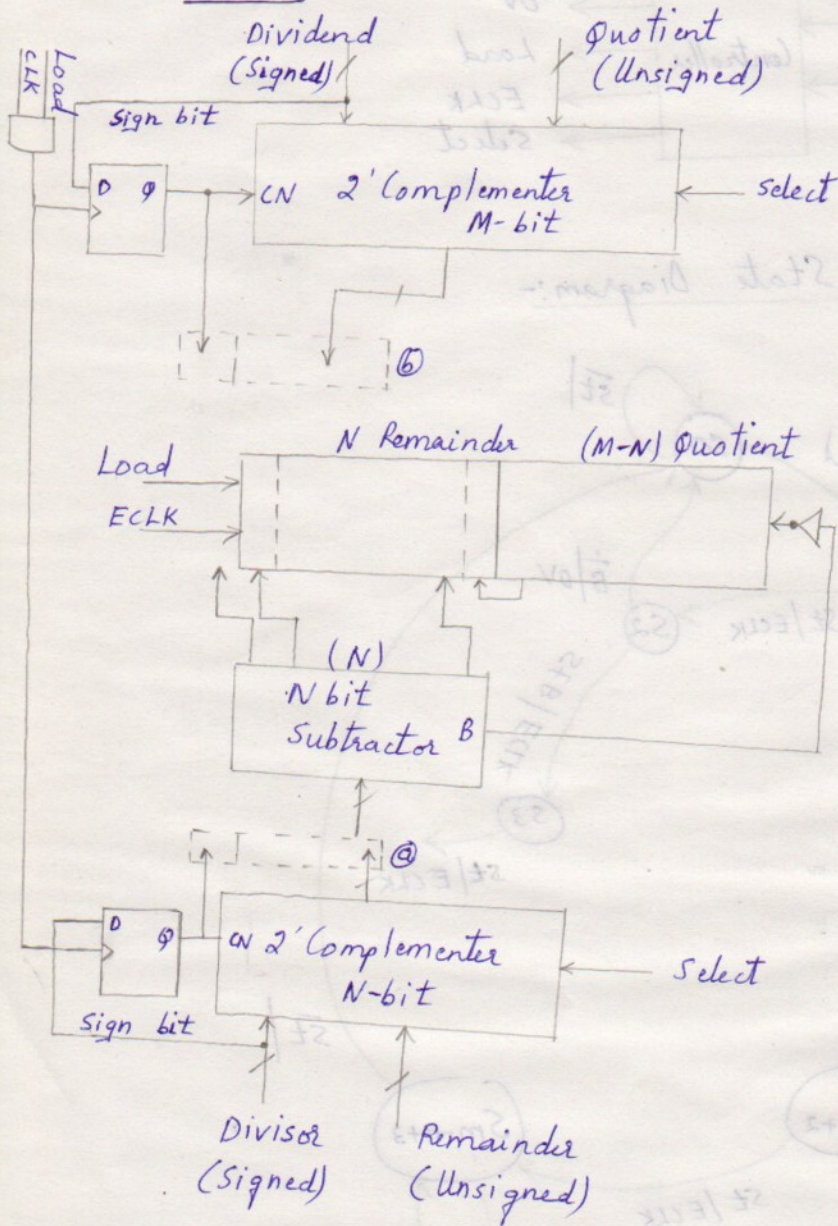


State Diagram : (SM1)



SBI/SBF Divider

ALU:

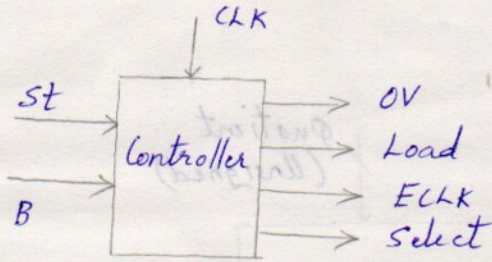


Dividend: Mbit
Divisor: Nbit

Select	M	N
0	Dividend	Divisor
1	Quotient	Remainder

- ① Divisor (Unsigned) / Remainder (Signed)
② Dividend (Unsigned) / Quotient (Signed)

Controller:-



State Diagram:-

