Tecnología de Computadores
Tema 5 / Problema 8
Libro de problemas

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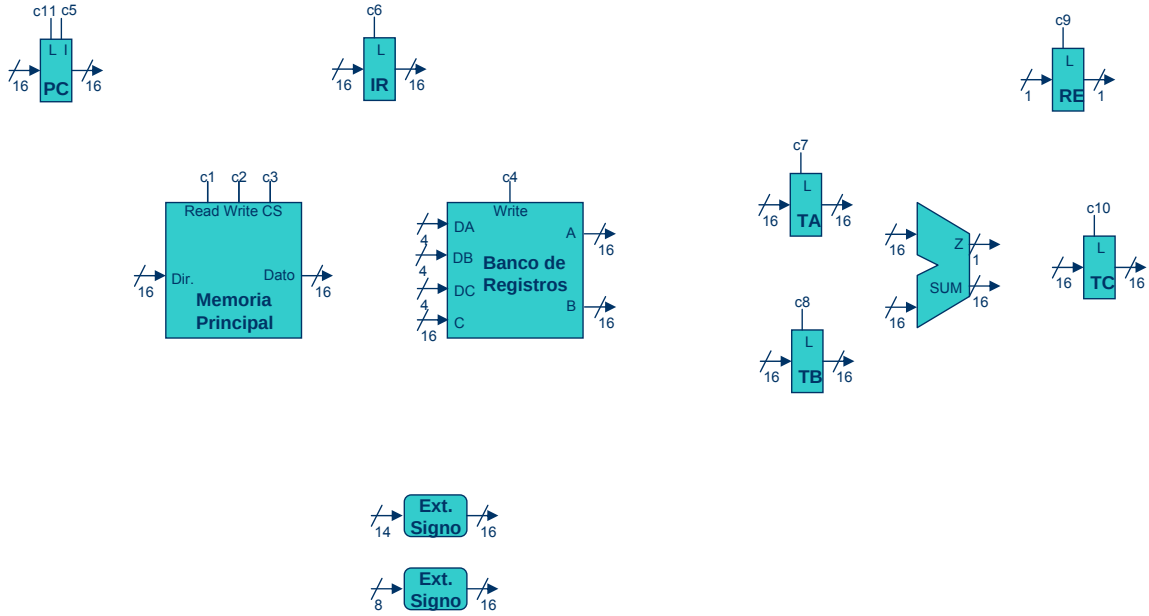
Descripción formato instrucción

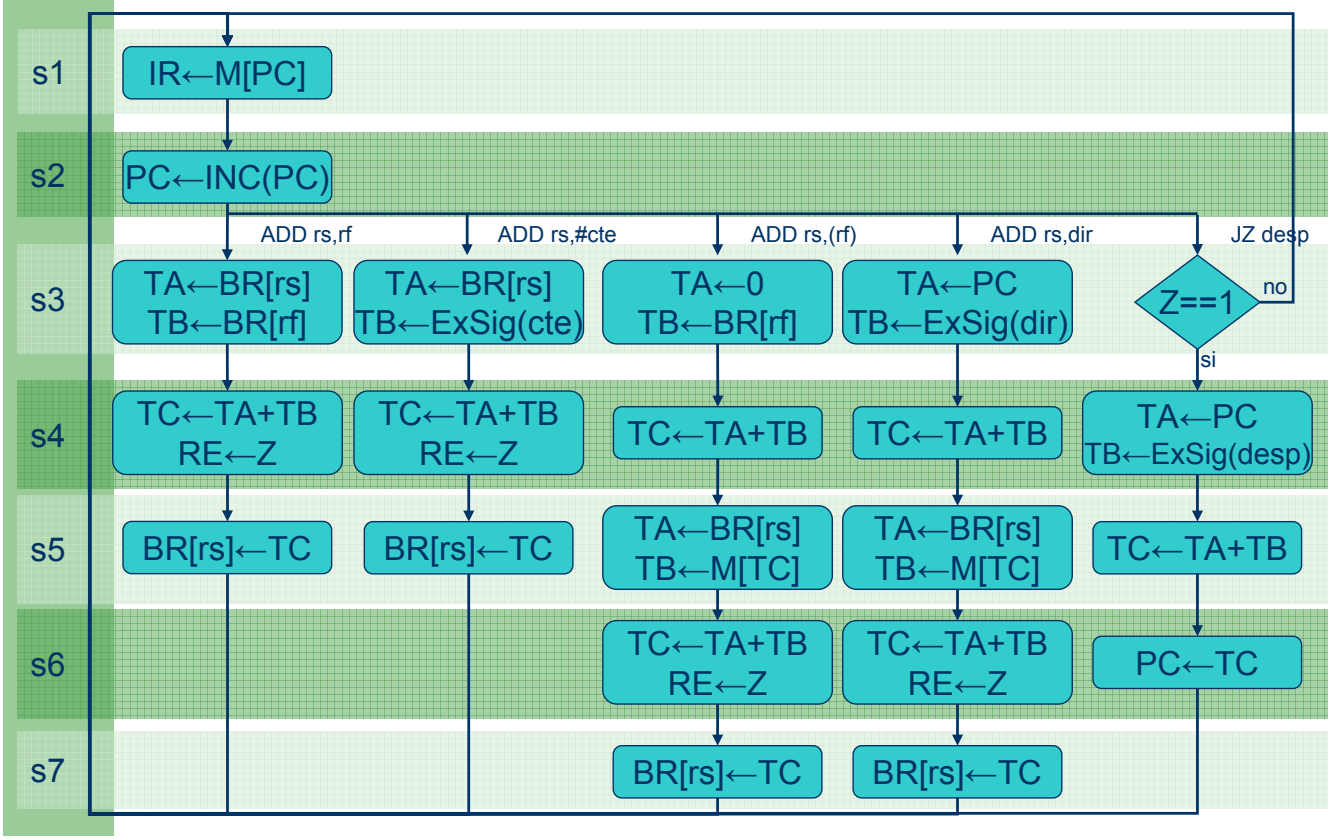
Instrucción		Formato de instrucción
Mnemónico	Significado	
ADD rs,rf	rs←SUMA(rs,rf)	00||rs||rf||xxxx||00
ADD rs,#cte	rs←SUMA(rs,cte)	00||rs|| cte ||01
ADD rs,(rf)	rs←SUMA(rs,M[rf])	00||rs||rf||xxxx||10
ADD rs,dir	rs←SUMA(rs,M[PC+dir])	00||rs|| dir ||11
JZ desp	Si z==1 PC←SUMA(PC,desp)	10|| desp

- Formato de Instrucción: 16 bits
- Código operación: bits[15:14]
- rs y rf: especifican un registro de un banco de 16 registros
- cte: representa una constante entera representada en C2
- dir y desp: representan una dirección efectiva de memoria representada en C2
- Instrucción ADD: bits[1:0]->Modo direccionamiento 2º operando

Datapath

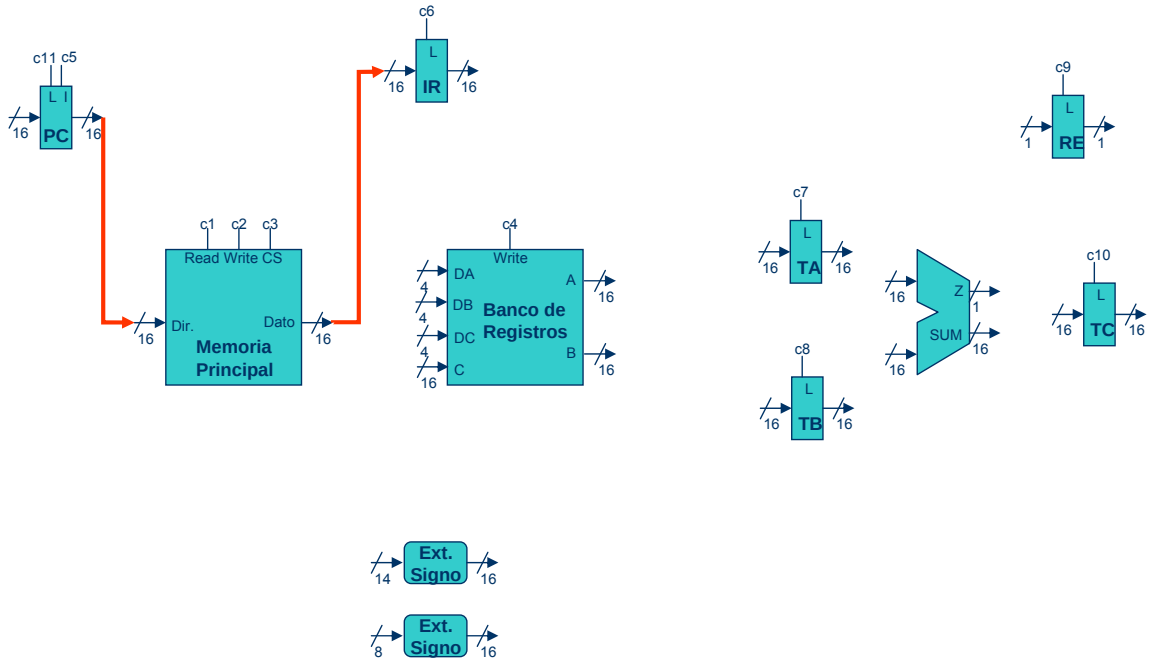


Ciclo de instrucción



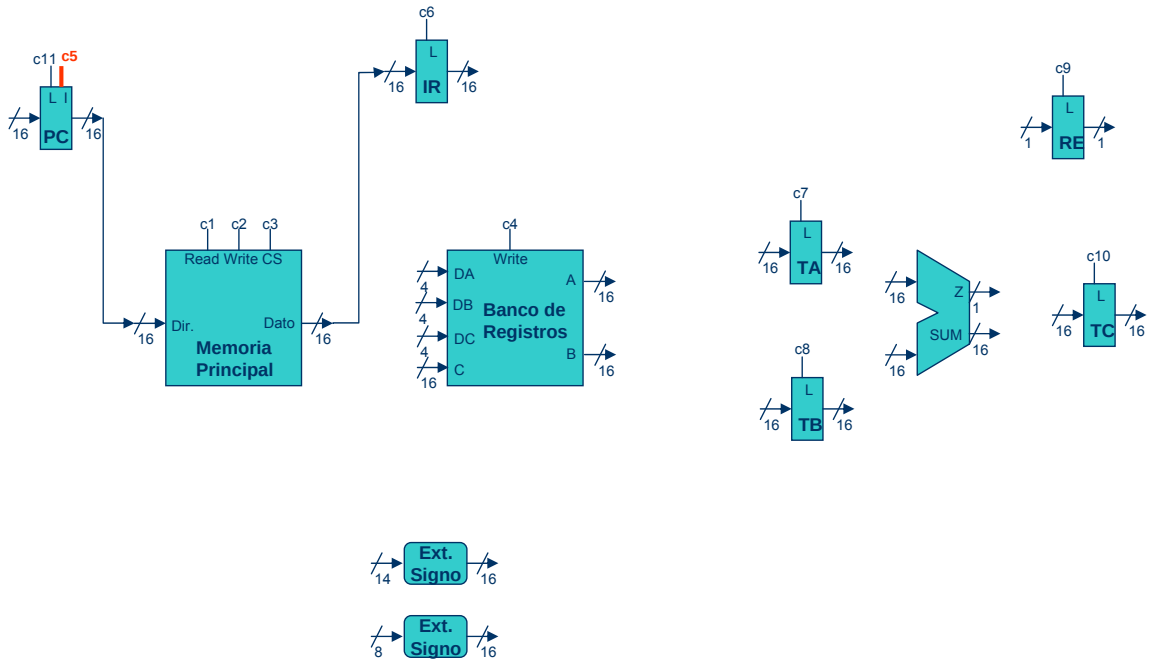
Datapath (fetching)

IR←M[PC]



Datapath (fetching)

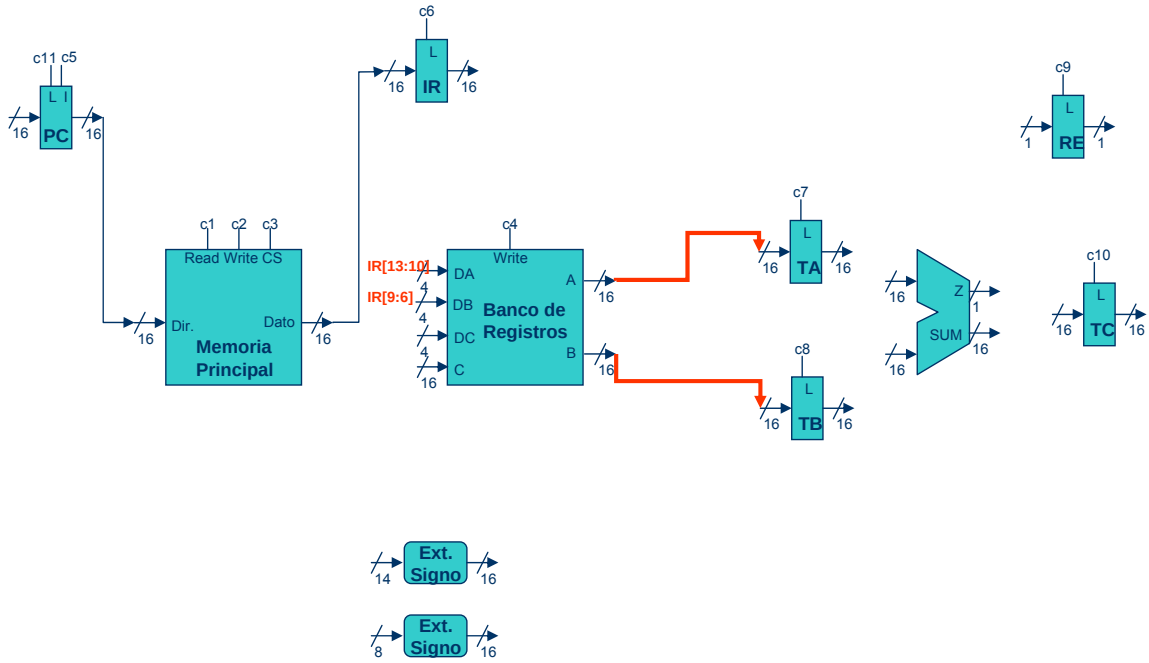
PC←INC(PC)



Datapath (ADD rs,rf)

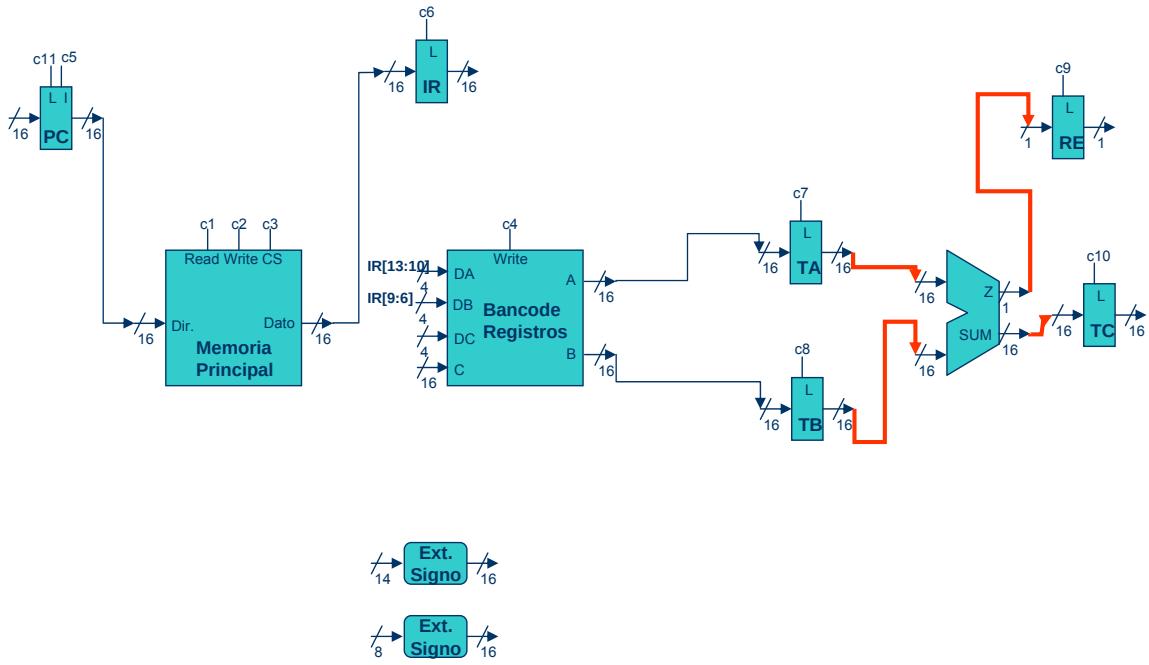
TA←BR[rs]
TB←BR[rf]

rs: IR[13:10] rf: IR[9:6]



Datapath (ADD rs,rf)

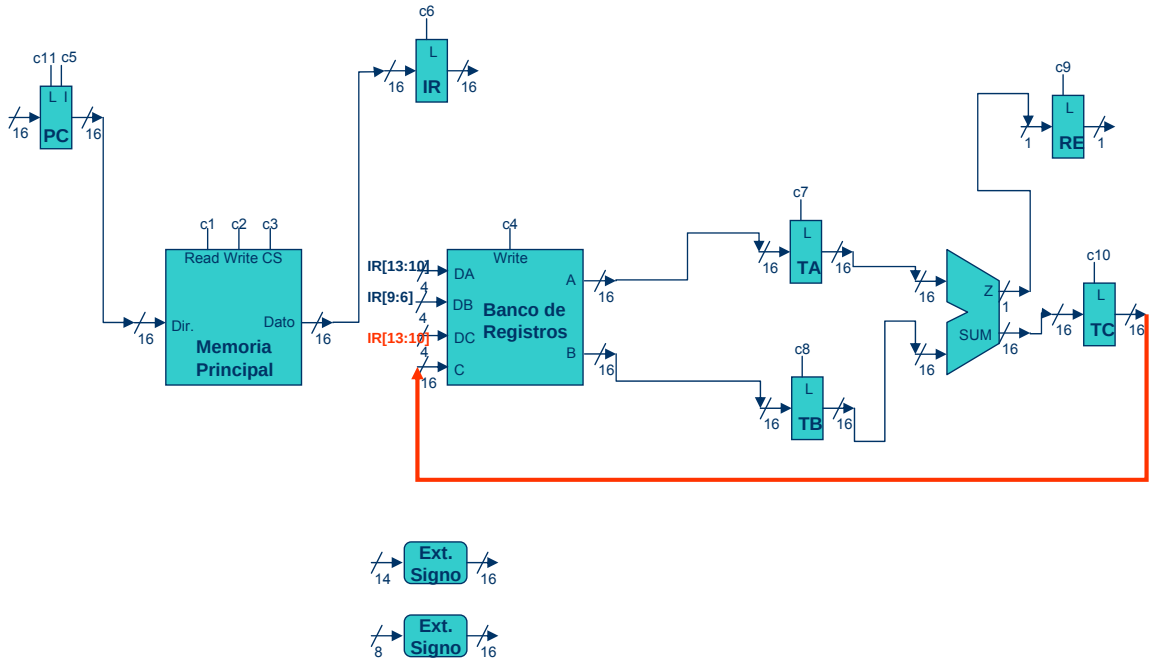
TC←TA+TB
RE←Z



Datapath (ADD rs,rf)

BR[rs]←TC

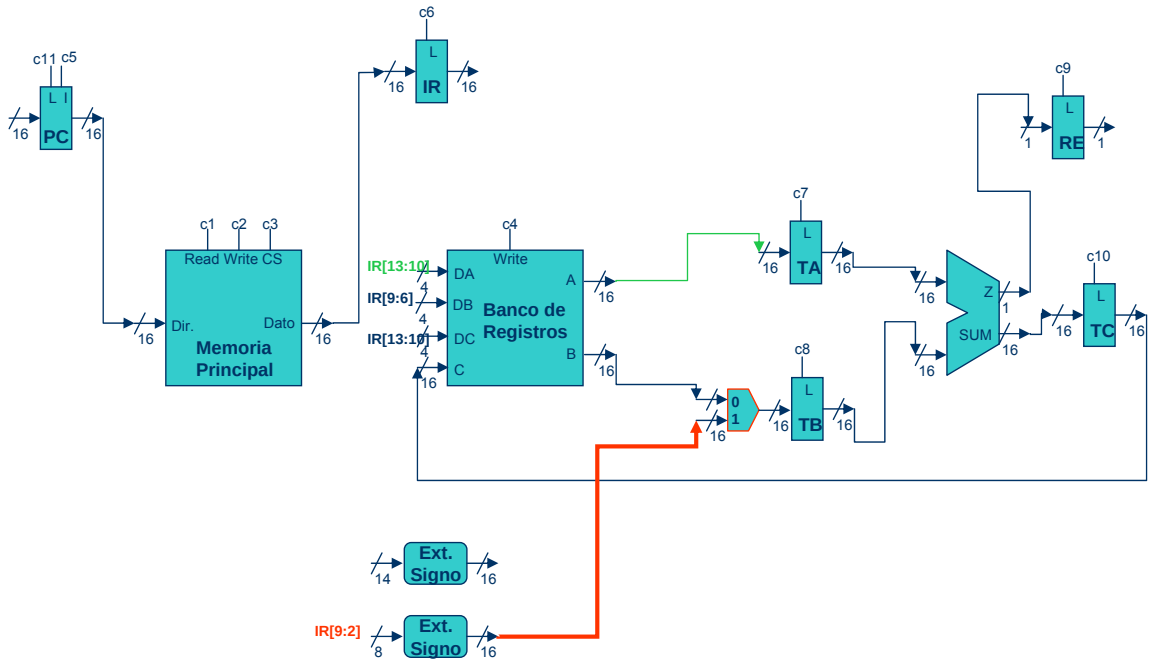
rs: IR[13:10]



Datapath (ADD rs,#cte)

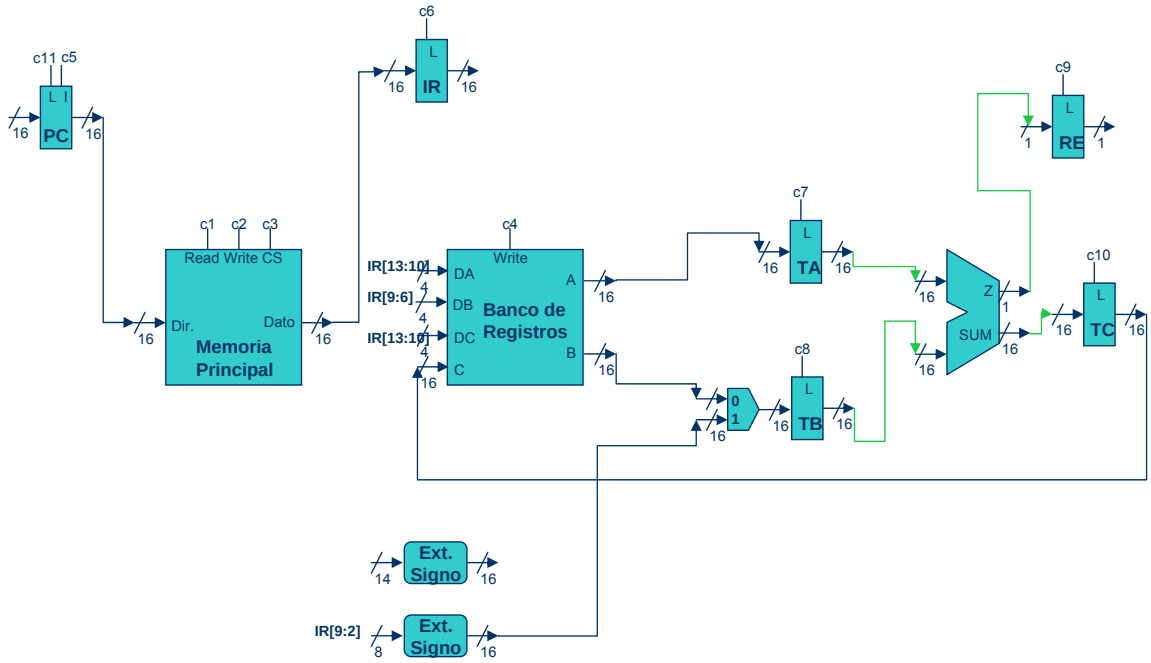
TA←BR[rs]
TB←ExSig(cte)

rs: IR[13:10] cte: IR[9:2]



Datapath (ADD rs,#cte)

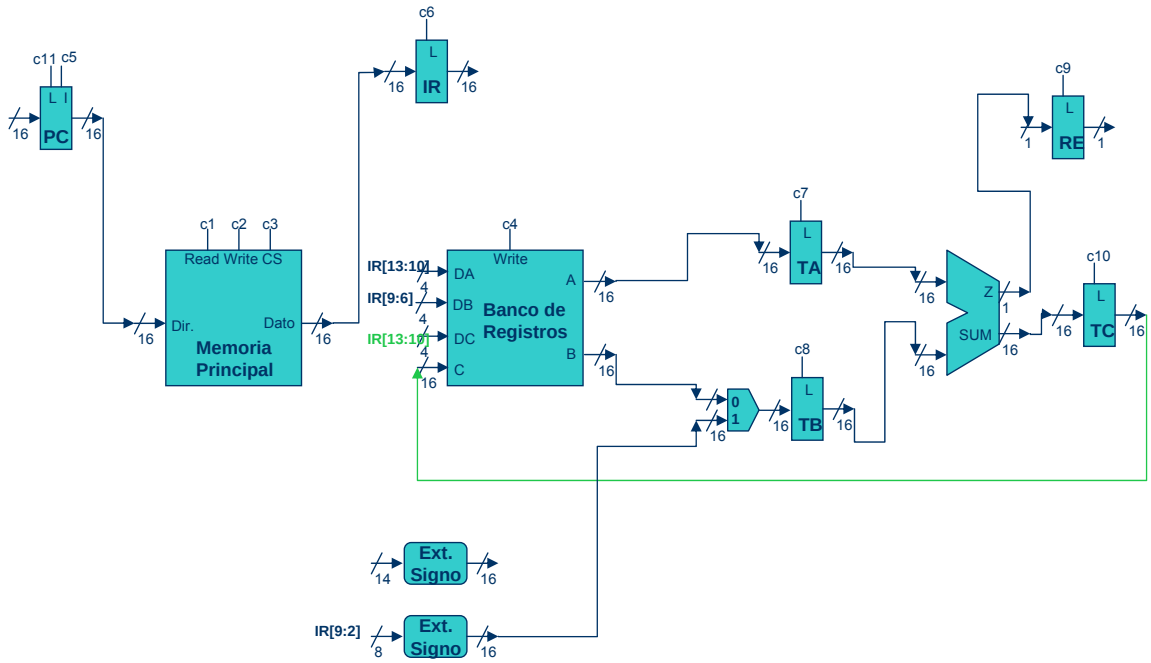
TC←TA+TB
RE←Z



Datapath (ADD rs,#cte)

BR[rs]←TC

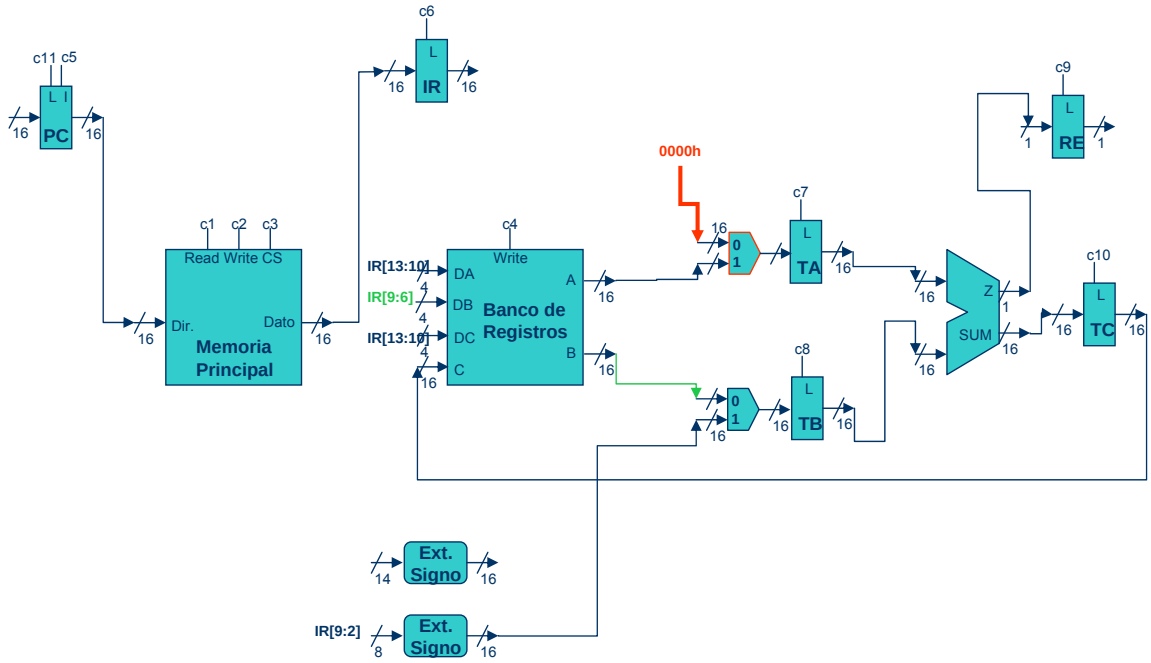
rs: IR[13:10]



Datapath (ADD rs,(rf))

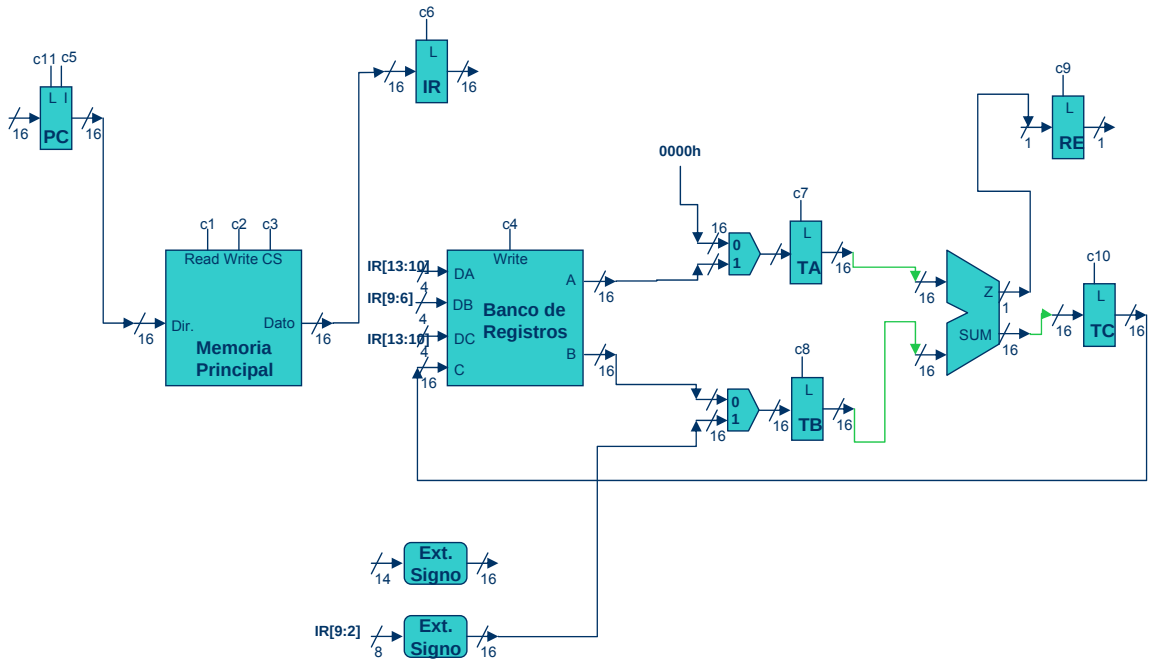
TA←0
TB←BR[rf]

rf: IR[9:6]



Datapath (ADD rs,(rf))

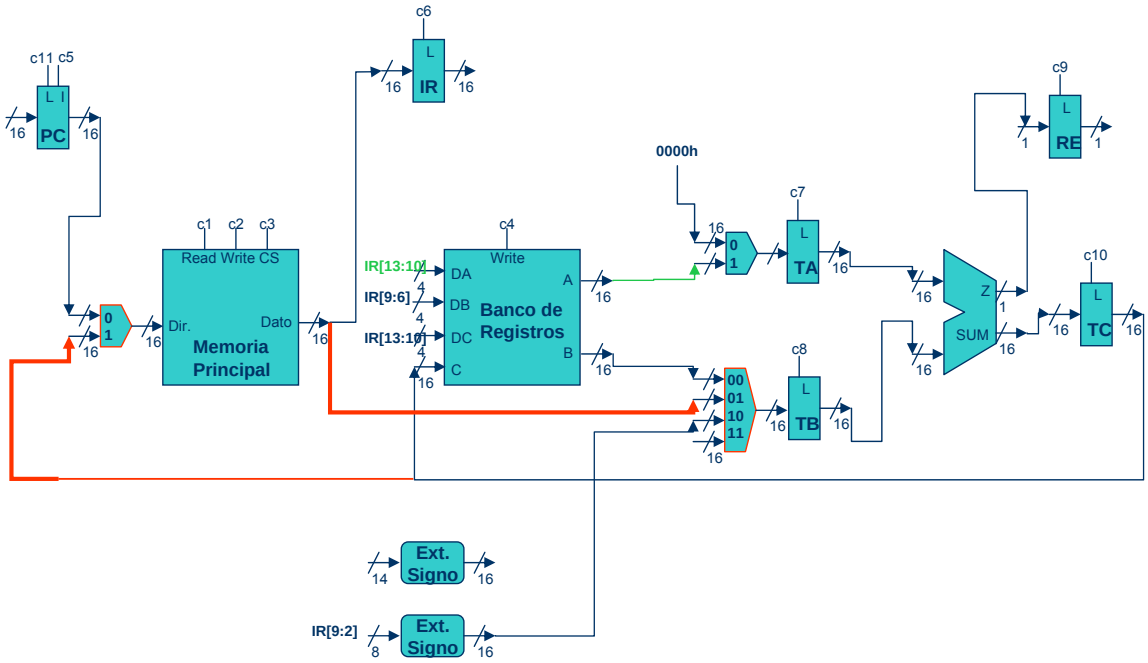
TC←TA+TB



Datapath (ADD rs,(rf))

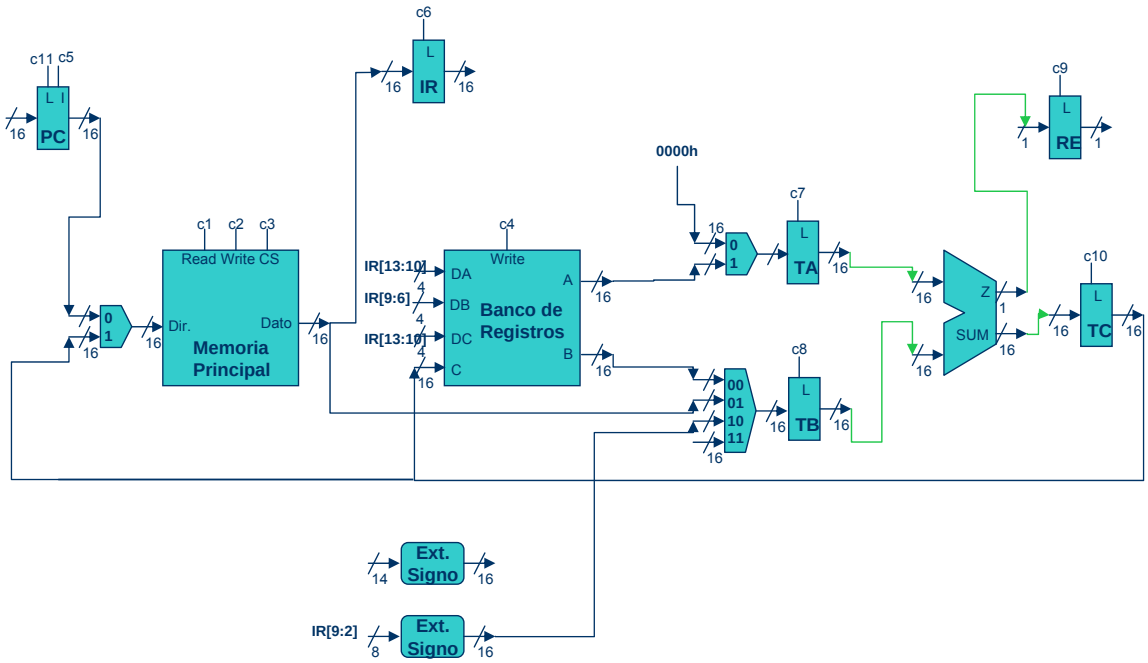
TA←BR[rs]
TB←M[TC]

rs: IR[13:10]



Datapath (ADD rs,(rf))

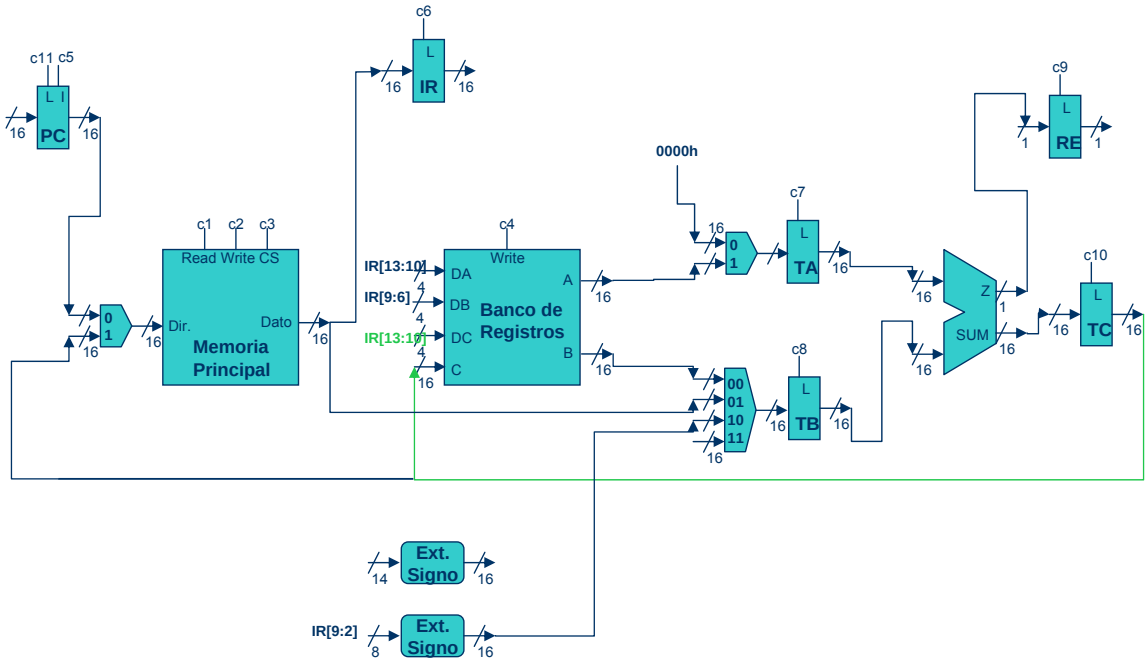
TC←TA+TB
RE←Z



Datapath (ADD rs,(rf))

BR[rs]←TC

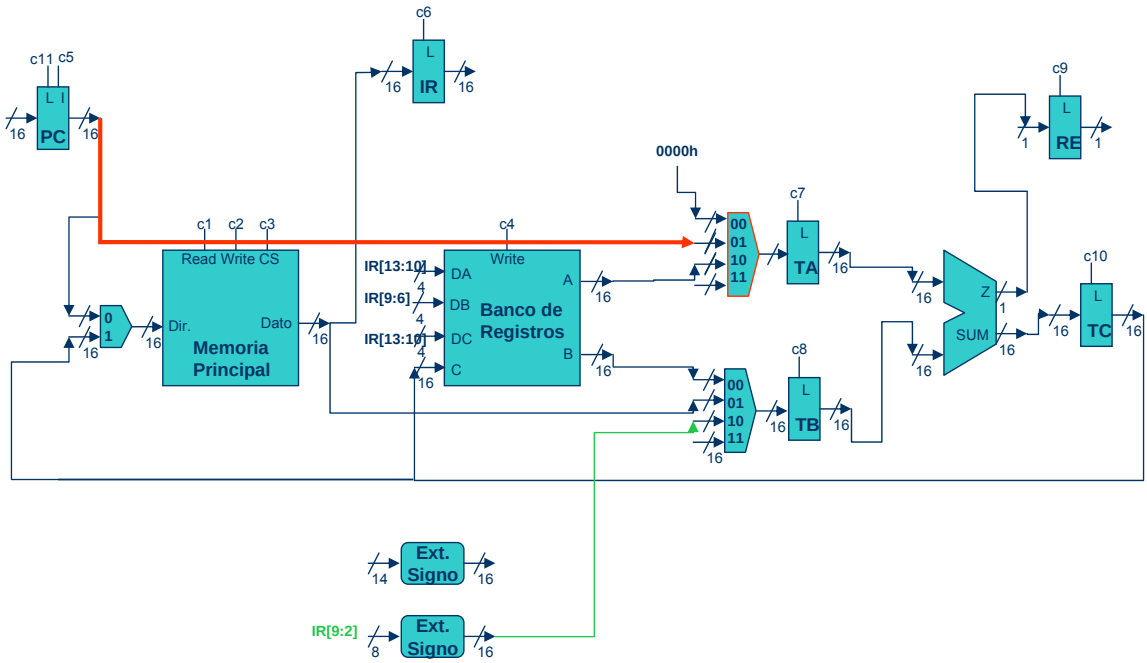
rs: IR[13:10]



Datapath (ADD rs,dir)

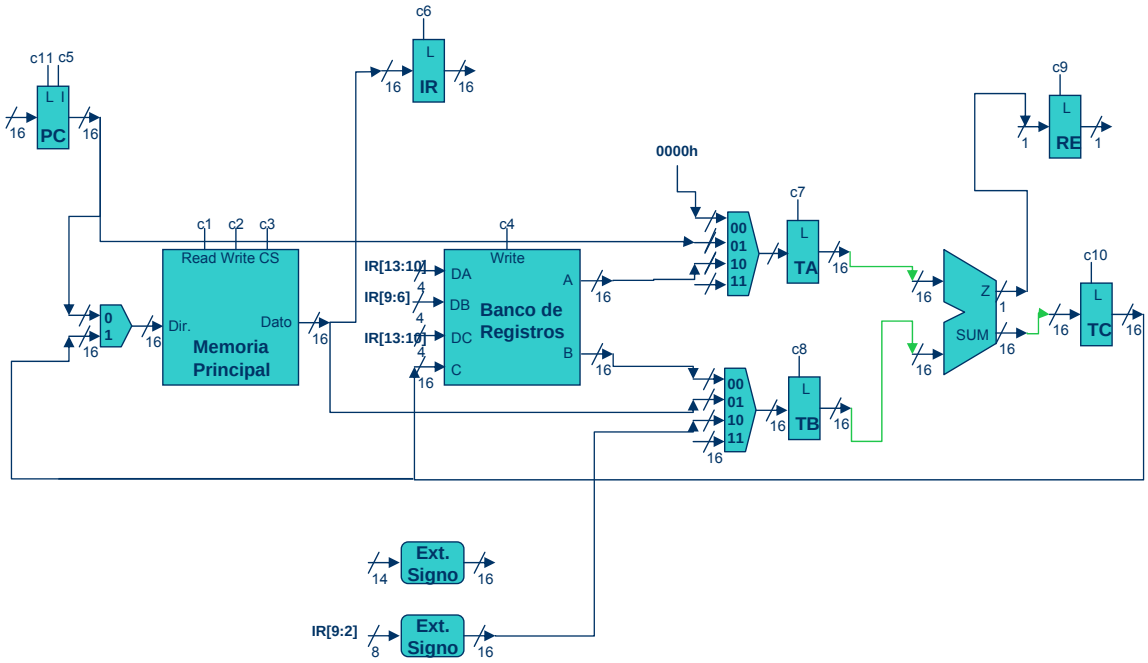
TA←PC
TB←ExSig(dir)

dir: IR[9:2]



Datapath (ADD rs,dir)

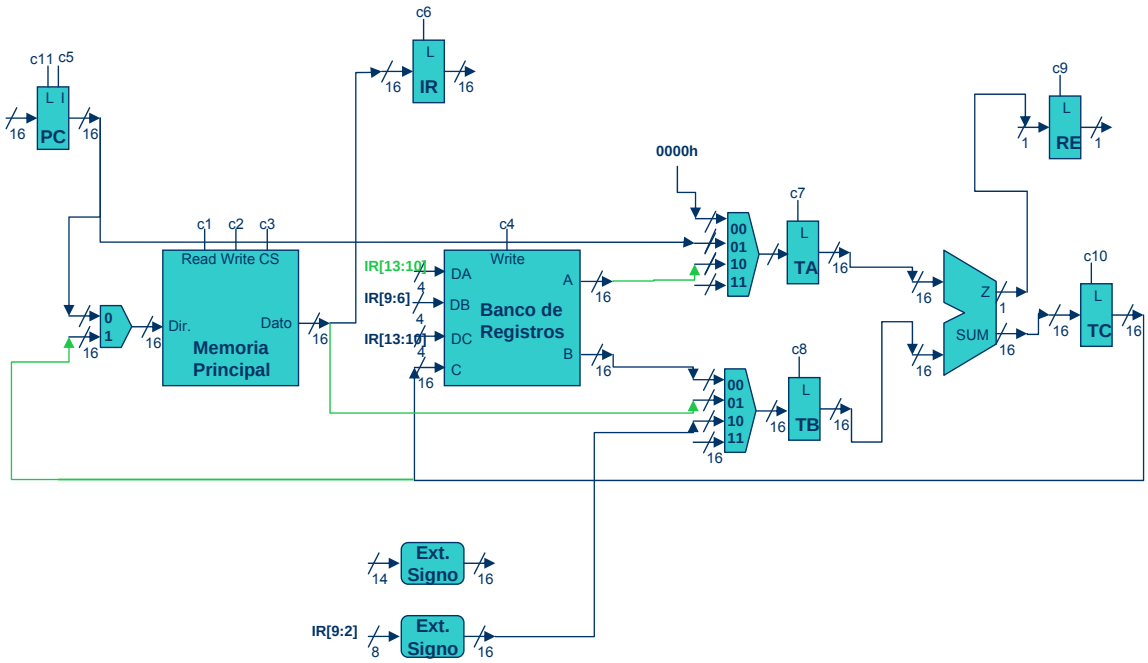
TC←TA+TB



Datapath (ADD rs,dir)

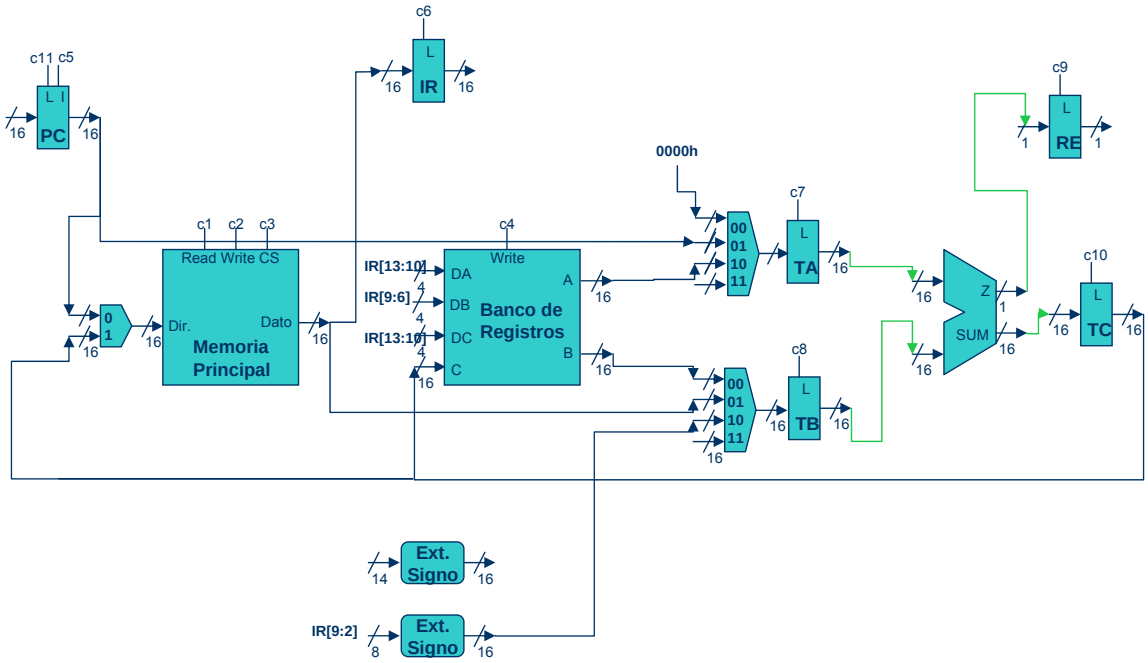
TA←BR[rs]
TB←M[TC]

rs: IR[13:10]



Datapath (ADD rs,dir)

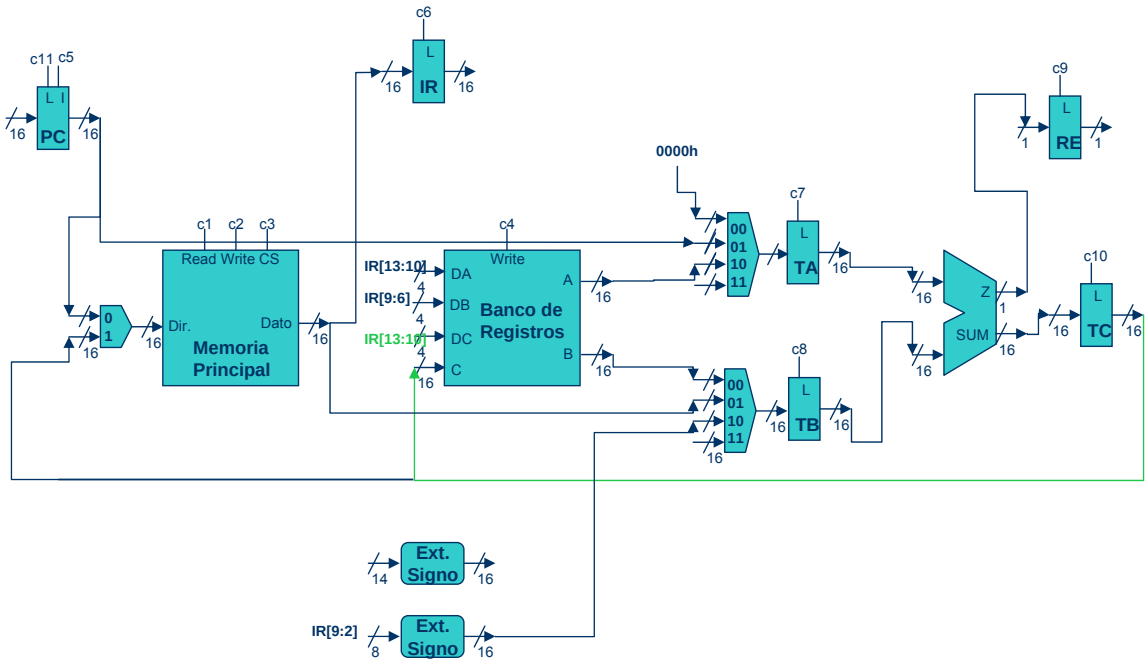
TC←TA+TB
RE←Z



Datapath (ADD rs,dir)

BR[rs]←TC

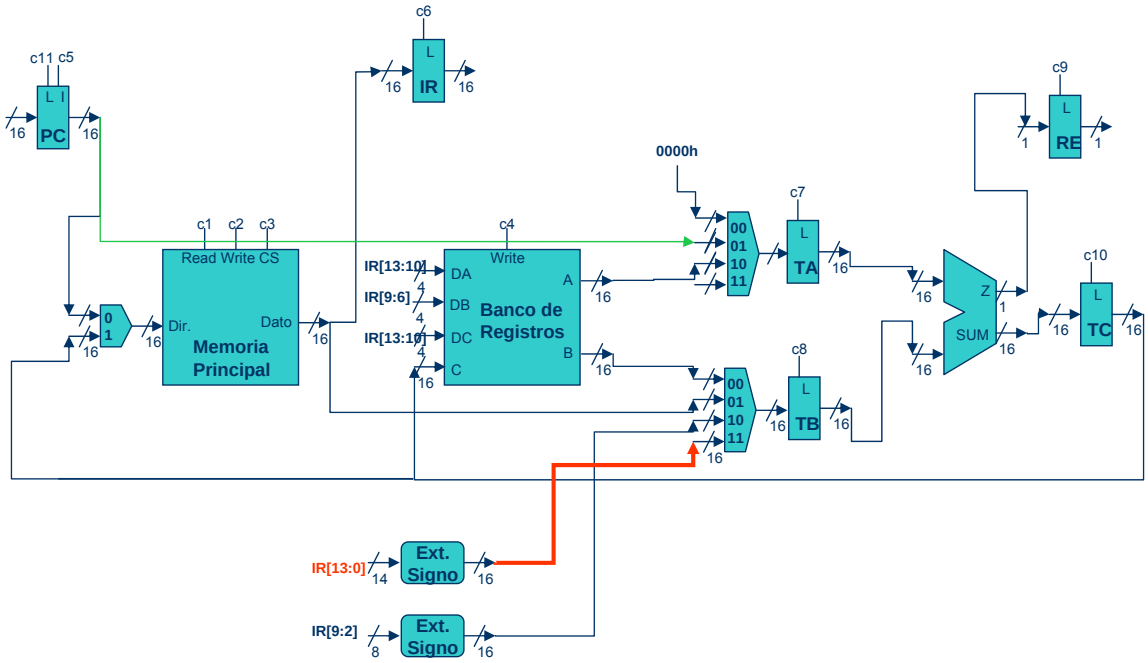
rs: IR[13:10]



Datapath (JZ desp)

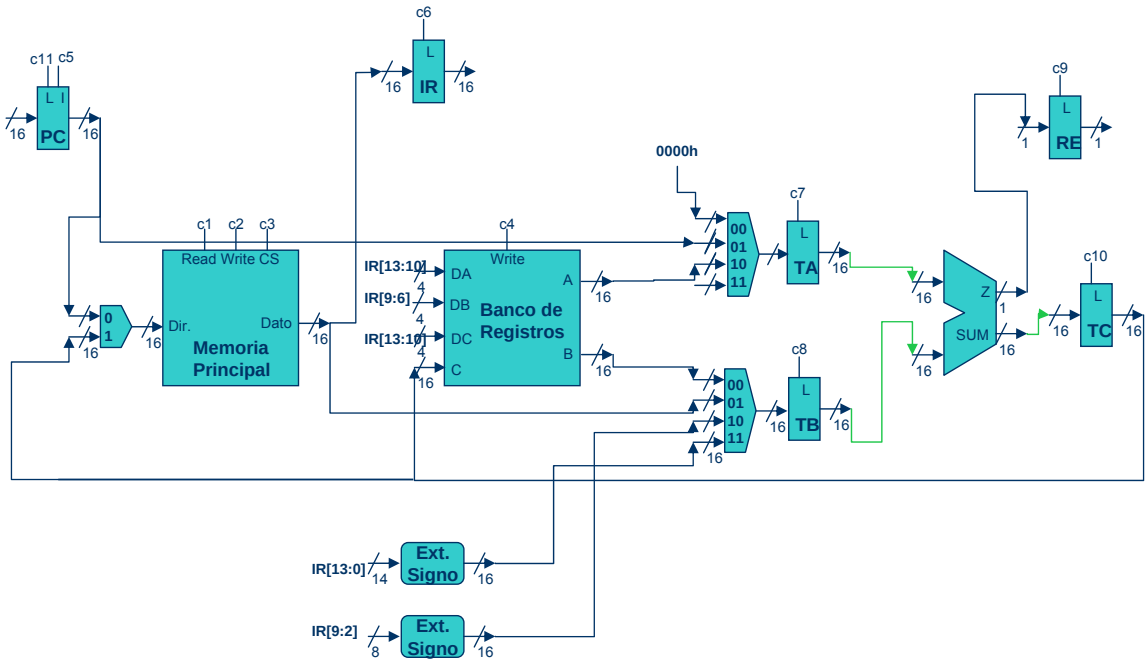
TA←PC
TB←ExSig(desp)

desp: IR[13:0]



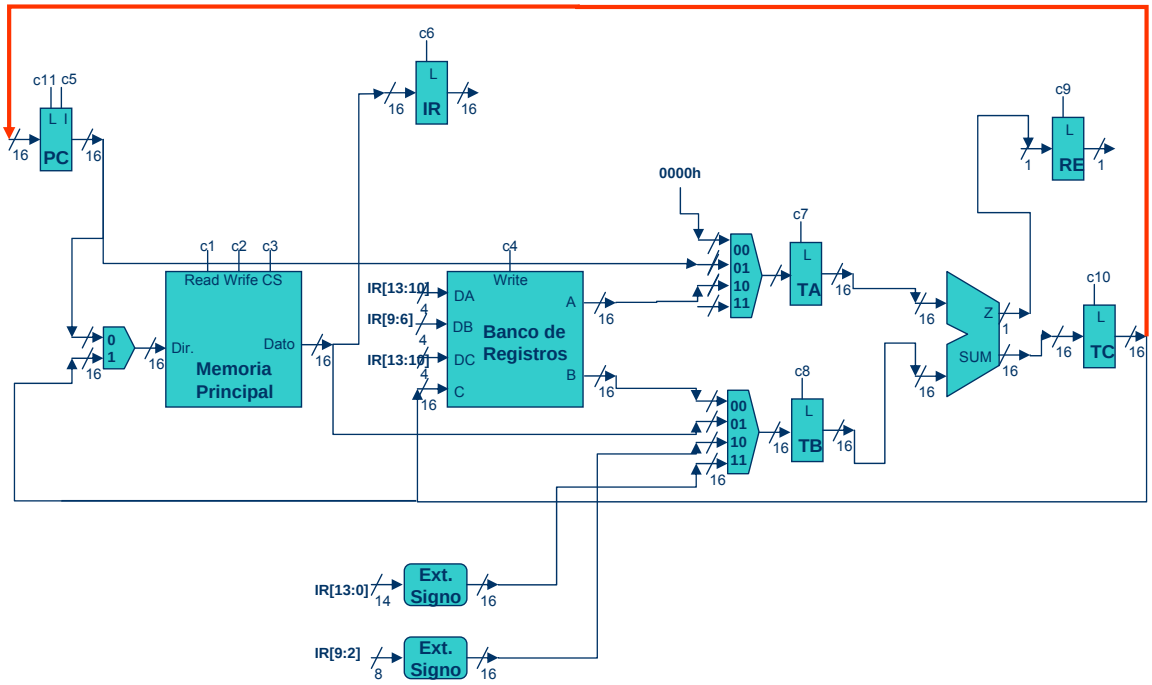
Datapath (JZ desp)

TC←TA+TB



Datapath (JZ desp)

PC←TC



Traza

Instrucción		Formato de instrucción
Mnemónico	Significado	
ADD rs,rf	rs←SUMA(rs,rf)	00||rs||rf||xxxx||00
ADD rs,#cte	rs←SUMA(rs,cte)	00||rs|| cte ||01
ADD rs,(rf)	rs←SUMA(rs,M[rf])	00||rs||rf||xxxx||10
ADD rs,dir	rs←SUMA(rs,M[PC+dir])	00||rs|| dir ||11
JZ desp	Si z==1 PC←SUMA(PC,desp)	10|| desp

PC=0045

Dir.	Cont.
…	…
29	0033
2A	0042
2B	0008
…	…
41	0023
42	000A
43	0C01
44	0001
45	1793

Dir.	Cont.
46	0542
47	0BD5
48	0480
49	0405
4A	8002
4B	0801
4C	0C01
4D	1001
4E	1401
…	…

Traza

29	**0033**
2A	**0042**
2B	**0008**
…	…
41	0023
42	000A
43	0C01
44	0001

Instrucción		Formatodeinstrucción
Mnemónico	Significado	
ADD rs,rf	rs←SUMA(rs,rf)	00||rs||rf||xxxx||00
ADD rs,#cte	rs←SUMA(rs,cte)	00||rs|| cte ||01
ADD rs,(rf)	rs←SUMA(rs,M[rf])	00||rs||rf||xxxx||10
ADD rs,dir	rs←SUMA(rs,M[PC+dir])	00||rs|| dir ||11
JZ desp	Si z==1 PC←SUMA(PC,desp)	10|| desp

0045:1793 ➡ 0001011110010011 ➡ ADD r5,-1C (r5=r5+M[2A]) ➡ r5=0042

0046:0542 ➡ 0000010101000010 ➡ ADD r1,(r5) (r1=r1+M[42]) ➡ r1=000A

0047:0BD5 ➡ 0000101111010101 ➡ ADD r2,#-B (r2=r2+FFF5) ➡ r2=FFF5

0048:0480 ➡ 0000010010000000 ➡ ADD r1,r2 (r1=r1+r2) ➡ r1=FFFF

0049:0405 ➡ 0000010000000101 ➡ ADD r1,#1 (r1=r1+1) ➡ r1=0000

004A:8002 ➡ 1000000000000010 ➡ JZ 2 (PC=PC+2) ➡ PC=004D

004D:1001 ➡ 0001000000000001 ➡ ADD r4,#0 (r4=r4+0) ➡ r4=0000