RTL

T0 : MAR ← PC

T1 : IR ← M [MAR], PC ← PC + 4

T2 : OPCODE ← IR [6 : 0]

T3, (R || I || S|| B) : FUNCT3 ← IR [14 : 12]

T3, (R || I || U || J) : GAR ← IR [11 : 7]

T3, R : FUNCT7 ← IR [31 : 25]

T3, I : GAR ← IR [11 : 7], IMM [11 : 0] ← IR [31 : 20]

T3, S : IMM [4 : 0] ← IR [11 : 7], IMM [11 : 5] ← IR [31 : 25]

T3, B : IMM [4 : 1|11] ← IR [11 : 7], IMM [12|10 : 5] ← IR [31 : 25]

T3, U : IMM [31 : 12] ← IR [31 : 12]

T3, J : IMM [20|10:1|11|19:12] ← IR [31 : 12]

R-TYPE

سلکتور های اول و دوم با آدرس رجیسترها تنظیم میکنیم تا وارد شوند

T4, R, 0x0, 0x00 : BUS← RS1 + RS2, SC ← 0

T4, R, 0x0, 0x20 : BUS ← RS1 - RS2, SC ← 0

T4, R, 0x4, 0x00 : BUS ← RS1 ^ RS2, SC ← 0

T4, R, 0x6, 0x00 : BUS ← RS1 | RS2, SC ← 0

T4, R, 0x7, 0x00 : BUS ← RS1 & RS2, SC ← 0

T4, R, 0x1, 0x00 : BUS ← RS1 << RS2, SC ← 0

T4, R, 0x5, 0x00 : BUS ← RS1 >> RS2, SC ← 0

T4, R, 0x5, 0x20 : BUS ← RS1 >> RS2, SC ← 0

T4, R, 0x2, 0x00 : RS1 - RS2(S)

T4, R, 0x2, 0x00 : BUS ← N, SC ← 0

T4, R, 0x3, 0x00 : RS1 - RS2(U)

T5, R, 0x3, 0x00 : BUS ← N, SC ← 0

T4, R, 0x0, 0x01 : BUS ← RS1 * RS2 [31 : 0], SC ← 0

T4, R, 0x1, 0x01 : BUS ← RS1 * RS2 [63 : 32], SC ← 0

T4, R, 0x4, 0x01 : BUS ← RS1 / RS2, SC ← 0

T4, R, 0x6, 0x01 : BUS ← RS1 % RS2, SC ← 0

I-TYPE

T4, I, 0x0, OPCODE = 0010011 : BUS ← RS1 + IMM, SC ← 0

T4, I, (0x1 || 0x2), OPCODE = 0000011: MAR ← RS1 + IMM

T5, I, 0x1, OPCODE = 0000011: BUS ← M [MAR] [15 : 0], SC ← 0

T5, I, 0x2, OPCODE = 0000011: BUS ← M [MAR] [31 : 0], SC ← 0

T4, I, 0x0, OPCODE = 1100111 : BUS ← PC + 4

T5, I, 0x0, OPCODE = 1100111 : PC ← PC + IMM, SC ← 0

S-TYPE

T4, S : MAR ← RS1 + IMM

T5, S, 0x1 : M [MAR][15 : 0] ← RS2 [15 : 0], SC ← 0

T5, S, 0x2 : M [MAR][31 : 0] ← RS2 [31 : 0], SC ← 0

B-TYPE

T4, B, (0x0 || 0x1 || 0x4 || 0x5) : RS1 – RS2(S)

T4, B, (0x6 || 0x7) : RS1 – RS2(U)

T5, B, 0x0, Z : PC ← PC + IMM, SC ← 0

T5, B, 0x1, !Z : PC ← PC + IMM, SC ← 0

T5, B, 0x4, N : PC ← PC + IMM, SC ← 0

T5, B, 0x5, (Z || P) : PC ← PC + IMM, SC ← 0

T5, B, 0x6 N : PC ← PC + IMM, SC ← 0

T5, B, 0x7, (P || Z) : PC ← PC + IMM, SC ← 0

J-TYPE

اینجا اول جواب میره روی باس و بعد مالتیپلکسر رجیست های عام منظوره غیر فعال شده و سپس کار های کلاک بعدی انجام میشود

T4, J : BUS ← PC + 4

T5, J : PC ← PC + IMM, SC ← 0

U-TYPE

T4, U, OPCODE = 0110111 : BUS ← IMM << 12, SC ← 0

T4, U, OPCODE = 0010111 : IMM ← IMM << 12

T5, U, OPCODE = 0010111 : BUS ← PC + IMM, SC ← 0