BEQ : BEQ R_A R_B Imm

$\overset{15-12}{}\overset{11-9}{}\overset{8-6}{}\overset{5-0}{}$

Single Step:

$111 \rightarrow RF\text{-}A_1$

$RF\text{-}D_1 \rightarrow Mem_1\text{-}Add, ALU_2\text{-}A, ALU_3\text{-}A$

$Mem\text{-}Data_{(11-9)} \rightarrow RF\text{-}A_2$

$Mem_1\text{-}Data_{(8-6)} \rightarrow RF\text{-}A_3$

$RF\text{-}D_2 \rightarrow ALU_1\text{-}A$

$RF\text{-}D_3 \rightarrow ALU_1\text{-}B$

$+2 \rightarrow ALU_2\text{-}B$

$Mem_1\text{-}Data_{(5-0)} \xrightarrow[25]{SE} ALU_3\text{-}B$

$111 \rightarrow RF\text{-}A_4$

If (Cond^h):

$\quad ALU_3\text{-}C \rightarrow RF\text{-}D_4$

Else

$\quad ALU_2\text{-}C \rightarrow RF\text{-}D_4$

Cond^h

BEQ : $(Z == 1)$

BLT : $(Z == 0) \&\& (Z == 1)$

BLE : $(C == 1)$

JAL : JALR. r_a Imm

$\overset{15-12}{}\overset{11-9}{}\quad\overset{8-0}{}$

$111 - RF\text{-}A_1$

$RF\text{-}D_1 \rightarrow Mem_1\text{-}Add, ALU_2\text{-}A, ALU_3\text{-}A$

$+2 \rightarrow ALU_2\text{-}B$

$Mem_1\text{-}data_{(8-0)} \xrightarrow[25]{SE} ALU_3\text{-}B$

$Mem_1\text{-}data_{(11-9)} \rightarrow RF\text{-}A_4$

$ALU_2\text{-}C \rightarrow RF\text{-}D_4$

$111 \rightarrow RF\text{-}A_5$

$ALU_3\text{-}C \rightarrow RF\text{-}D_4$

JLR : JLR r_a r_b

$111 \rightarrow RF\text{-}A_1$

$RF\text{-}D_1 \rightarrow Mem_1\text{-}Add, ALU_2\text{-}A, ALU_3\text{-}A$

$+2 \rightarrow ALU_2\text{-}B$

$Mem_1\text{-}Data_{(11-9)} \rightarrow RF\text{-}A_4$

$ALU_2\text{-}C \rightarrow RF\text{-}D_4$

$Mem_1\text{-}Data_{(8-6)} \rightarrow RF\text{-}A_2$

$RF\text{-}D_2 \rightarrow RF\text{-}D_5$

$111 \rightarrow RF\text{-}A_5$

JRI :   JRI   ra,   Imm

$111 \rightarrow RF\_A_1$

$RF\_D_1 \rightarrow Mem.\_Add$

$Mem\_Data_{(11-9)} \rightarrow RF\_A_2$

$RF\_D_2 \rightarrow ALU_3\_A$

$Mem\_Data_{(8-0)} \xrightarrow[IS]{SE} ALU_3\_B$

$ALU_3\_C \rightarrow RF\_D_4$

$111 \rightarrow RF\_A_3$