**Main control Truth Table:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Opcode | RegDes | RegSrc2 | RegWr | ExtOp | ALUSrc | Mem\_Rd | Mem\_Wr | WB\_data |
| R-type | 1 🡪 Rd | 0 | 1 | X | 0 | 0 | 0 | 0 = ALU |
| ANDI | 0 🡪 Rs2 | 0 | 1 | 0 🡪 zero | 1 🡪 imm | 0 | 0 | 0 = ALU |
| ADDI | 0 🡪 Rs2 | 0 | 1 | 1 🡪 sign | 1 🡪 imm | 0 | 0 | 0 = ALU |
| LW | 0 🡪 Rs2 | 0 | 1 | 1 🡪 sign | 1 🡪 imm | 1 | 0 | 1 = Mem |
| LW.POI | 0 🡪 Rs2 |  |  | 1 🡪 sign | 1 🡪 imm | 1 | 0 | 1 = Mem |
| SW | X | X | 0 | 1 🡪 sign | 1 🡪 imm | 0 | 1 | X |
| BGT | X | 1 | 0 | 1 🡪 sign | 0 🡪 BusB | 0 | 0 | X |
| BLT | X | 1 | 0 | 1 🡪 sign | 0 🡪 BusB | 0 | 0 | X |
| BEQ | X | 1 | 0 | 1 🡪 sign | 0 🡪 BusB | 0 | 0 | X |
| BNQ | X | 1 | 0 | 1 🡪 sign | 0 🡪 BusB | 0 | 0 | X |
| JMP | X | X | 0 | X | X | 0 | 0 | X |
| CALL | X | X | 0 | X | X | 0 | 0 | X |
| RET | X | X | 0 | X | X | 0 | 0 | X |
| PUSH | X | 1 | 0 | X | X | 0 | 0 | X |
| POP | 1 | X | 1 | X | X | 0 | 0 | X |

**Stack table:**

|  |  |  |  |
| --- | --- | --- | --- |
| Opcode | Type | SpOp | StackOp |
| Call | J-TYPE | 1 | 1 |
| Push | S-Type | 1 | 0 |
| POP, RET | S-TYPE, J-TYPE | 0 | X |