|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| State (Name) | NextPC | Branch | MemW | RegW | IRWrite | AdrSrc | ResultSrc1:0 | ALUSrcA1:0 | | ALUSrcB1:0 | ALUOp | FSM Control Word |
| 0 (Fetch) | 1 | 0 | 0 | 0 | 1 | 0 | 10 | 0 | 1 | 10 | 0 | 0x114C |
| 1 (Decode) | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 1 | 10 | 0 | 0x004C |
| 2 (MemAdr) | 0 | 0 | 0 | 0 | 0 | 0 | 00 | 0 | 0 | 01 | 0 | 0x0002 |
| 3 (MemRead) | 0 | 0 | 0 | 0 | 0 | 1 | 00 | 0 | 0 | 00 | 0 | 0x0080 |
| 4 (MemWB) | 0 | 0 | 0 | 1 | 0 | 0 | 01 | 0 | 0 | 00 | 0 | 0x0220 |
| 5 (MemWrite) | 0 | 0 | 1 | 0 | 0 | 1 | 00 | 0 | 0 | 00 | 0 | 0x0480 |
| 6 (ExecuteR) | 0 | 0 | 0 | 0 | 0 | 0 | 00 | 0 | 0 | 00 | 1 | 0x0001 |
| 7 (ExecuteI) | 0 | 0 | 0 | 0 | 0 | 0 | 00 | 0 | 0 | 01 | 1 | 0x0003 |
| 8 (ALUWB) | 0 | 0 | 0 | 1 | 0 | 0 | 00 | 0 | 0 | 00 | 0 | 0x0200 |
| 9 (Branch) | 0 | 1 | 0 | 0 | 0 | 0 | 10 | 1 | 0 | 01 | 0 | 0x0852 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Controller inputs | | Controller outputs | | | | | | | | | | | |
| Test Code | **State** | Instr 31:12 | ALUFlags 3:0 | PCWritw | MemWrite | RegWrite | IRWrite | AdrSrc | RegSrc 1:0 | ALUSrcA 1:0 | ALUSrcB 1:0 | ResultSrc 1:0 | ImmSrc 1:0 | ALUControl 1:0 | EntireOutput |
| ADD R1, R2, #2 | Fetch | 0xE2821 | 0x0 | 1 | 0 | 0 | 1 | 0 | 00 | 01 | 10 | 10 | 00 | 00 | 0x121A0 |
| Decode | 0 | 0 | 0 | 0 | 0 | 01 | 10 | 10 | 00 | 0x001A0 |
| ExecuteI | 0 | 0 | 0 | 0 | 0 | 00 | 01 | 00 | 00 | 0x00040 |
| ALUWB | 0 | 0 | 1 | 0 | 0 | 00 | 00 | 00 | 00 | 0x04000 |
| SUB R4, R3, R5 | Fetch | 0xE0434 | 0x0 | 1 | 0 | 0 | 1 | 0 | 00 | 01 | 10 | 10 | 00 | 00 | 0x121A0 |
| Decode | 0 | 0 | 0 | 0 | 0 | 01 | 10 | 10 | 00 | 0x001A0 |
| ExecuteR | 0 | 0 | 0 | 0 | 0 | 00 | 00 | 00 | 01 | 0x00001 |
| ALUWB | 0 | 0 | 1 | 0 | 0 | 00 | 00 | 00 | 00 | 0x04000 |
| ANDS R7, R2, R3 | Fetch | 0xE0127 | 0x0 | 1 | 0 | 0 | 1 | 0 | 00 | 01 | 10 | 10 | 00 | 00 | 0x121A0 |
| Decode | 0 | 0 | 0 | 0 | 0 | 01 | 10 | 10 | 00 | 0x001A0 |
| ExecuteR | 0 | 0 | 0 | 0 | 0 | 00 | 00 | 00 | 10 | 0x00002 |
| ALUWB | 0 | 0 | 1 | 0 | 0 | 00 | 00 | 00 | 00 | 0x04000 |
| ORNE R2, R1, #5 | Fetch | 0x13812 | 0x0 | 1 | 0 | 0 | 1 | 0 | 00 | 01 | 10 | 10 | 00 | 00 | 0x121A0 |
| Decode | 0 | 0 | 0 | 0 | 0 | 01 | 10 | 10 | 00 | 0x001A0 |
| ExecuteI | 0 | 0 | 0 | 0 | 0 | 00 | 01 | 00 | 11 | 0x00043 |
| ALUWB | 0 | 0 | 1 | 0 | 0 | 00 | 00 | 00 | 00 | 0x04000 |
| LDR R3, [R1, #10] | Fetch | 0xE5913 | 0x0 | 1 | 0 | 0 | 1 | 0 | 10 | 01 | 10 | 10 | 01 | 00 | 0x129A4 |
| Decode | 0 | 0 | 0 | 0 | 0 | 01 | 10 | 10 | 00 | 0x009A4 |
| MemAdr | 0 | 0 | 0 | 0 | 0 | 00 | 01 | 00 | 00 | 0x00844 |
| MemRD | 0 | 0 | 0 | 0 | 1 | 00 | 00 | 00 | 00 | 0x01804 |
| MemWB | 0 | 0 | 1 | 0 | 0 | 00 | 00 | 01 | 00 | 0x04814 |
| STR R5, [R2, #2] | Fetch | 0xE5825 | 0x0 | 1 | 0 | 0 | 1 | 0 | 10 | 01 | 10 | 10 | 01 | 00 | 0x129A4 |
| Decode | 0 | 0 | 0 | 0 | 0 | 01 | 10 | 10 | 00 | 0x009A4 |
| MemAdr | 0 | 0 | 0 | 0 | 0 | 00 | 01 | 00 | 00 | 0x00844 |
| MemWR | 0 | 1 | 0 | 0 | 1 | 00 | 00 | 00 | 00 | 0x09804 |
| B | Fetch | 0xEA000 | 0x0 | 1 | 0 | 0 | 1 | 0 | 01 | 01 | 10 | 10 | 10 | 00 | 0x125A8 |
| Decode | 0 | 0 | 0 | 0 | 0 | 01 | 10 | 10 | 00 | 0x005A8 |
| Branch | 1 | 0 | 0 | 0 | 0 | 10 | 01 | 10 | 00 | 0x10668 |
| BEQ | Fetch | 0x1A000 | 0x4 | 1 | 0 | 0 | 1 | 0 | 01 | 01 | 10 | 10 | 10 | 00 | 0x125A8 |
| Decode | 0 | 0 | 0 | 0 | 0 | 01 | 10 | 10 | 00 | 0x005A8 |
| Branch | 1 | 0 | 0 | 0 | 0 | 10 | 01 | 10 | 00 | 0x10668 |
| BEQ | Fetch | 0x0A000 | 0x4 | 1 | 0 | 0 | 1 | 0 | 01 | 01 | 10 | 10 | 10 | 00 | 0x125A8 |
| Decode | 0 | 0 | 0 | 0 | 0 | 01 | 10 | 10 | 00 | 0x005A8 |
| Branch | 0 | 0 | 0 | 0 | 0 | 10 | 01 | 10 | 00 | 0x00668 |