|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Function | J | C | D1 | D0 | Sreg | S |  |  |
| R1=R1+R2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| R2=R1+R2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| R1=R1-R2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| R2=R1-R2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| Ro=R1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| R1 ldi | 0 | 0 | 0 | 0 | 1 | Imm2 | Imm1 | Imm0 |
| R2 ldi | 0 | 0 | 0 | 1 | 1 | Imm2 | Imm1 | Imm0 |
| JMP if carry | 0 | 1 | 1 | 1 | 0 | Imm2 | Imm1 | Imm0 |
| JMP | 1 | 0 | 1 | 1 | 0 | Imm2 | Imm1 | Imm0 |

* The last 3 bits are custom inputs while 2nd bit serves dual purpose.

|  |  |
| --- | --- |
| Bit | Function Explanation |
| 7  J | JMP  When it is set to 1, the instruction will be interpreted as a Jump instruction by the CPU. |
| 6  C | JMP if Carry  Set to 1 when ALU operation produces a carry |
| 5,4  D1, D0 | REGISTER ADDRESS   |  |  | | --- | --- | | 00 | Ra | | 01 | Rb | | 11 | No reg | | 10 | Ro | |
| 3  Sreg | Selects either the output of the ALU(0) or the custom input(1). |
| 2  S | ALU Selection Bit  When 0, addition.  When 1, subtraction. |
| 2,1,0 | CUSTOM INPUT  user-specified input of any value in 3 bit range. |