EZ-CPU CONTROL SYSTEM

CONTROLLING OUTPUTS - 1

<table>
<thead>
<tr>
<th>PROGRAM:</th>
<th>BINARY COUNTER</th>
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<tr>
<td>DESCRIPTION:</td>
<td>Display a continually incrementing value via the output port.</td>
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<tr>
<td>IP MODULE:</td>
<td>-</td>
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<td>OP MODULE:</td>
<td>-</td>
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<tr>
<td>CPU SPEED:</td>
<td>1 KHz</td>
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</table>

- Remember that when calculating relative jumps, the Program Counter is pointing to the next instruction when the jump is calculated (fetch then execute)

```
ADDR | INSTRUCTION | CODE  
---|-------------|-------|
00   | LD A,0      | 3E 00 |
02   | OUT (0xFF),A| D3 FF |
04   | INC A       | 3C    |
05   | JR -5       | 18 FB |
```

To slow down the speed of this counter, a delay is needed. This can be done in a similar way as above, without sending the value to the port. To make a delay, load a register with a value and keep decrementing it until it equals zero. At 1KHz CPU speed, the delay loop will take 4 cycles = 4ms. Repeat that loop 125 times and the delay will take 125 x 4ms = 0.5 seconds.

```
ADDR | INSTRUCTION | CODE  
---|-------------|-------|
00   | LD A,0      | 3E 00 |
02   | OUT (0xFF),A| D3 FF |
04   | INC A       | 3C    |
05   | LD B,0x7D   | 06 7D |
07   | DEC B       | 05    |
08   | JRNZ -3     | 20 FD |
0A   | JR -10      | 18 F6 |
```