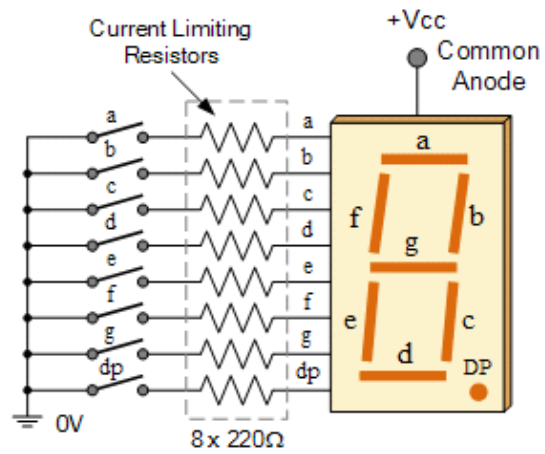


## Diseño Esquemático

### Decoder BCD

| B3 B2 B1 B0 | A B C D E F G |
|-------------|---------------|
| 0000        | 0000001       |
| 0001        | 1001111       |
| 0010        | 0010010       |
| 0011        | 0000110       |
| 0100        | 1001100       |
| 0101        | 0100100       |
| 0110        | 0100000       |
| 0111        | 0001111       |
| 1000        | 0000000       |
| 1001        | 0000100       |



### Expresión Booleana

$$A = B_0 + B_2 + B_1B_3 + B_1'B_3'$$

$$B = B_1' + B_2'B_3' + B_2B_3$$

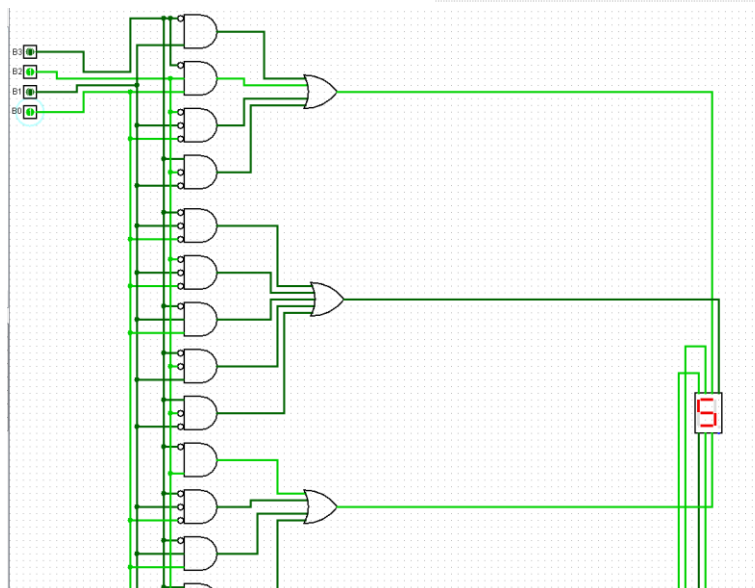
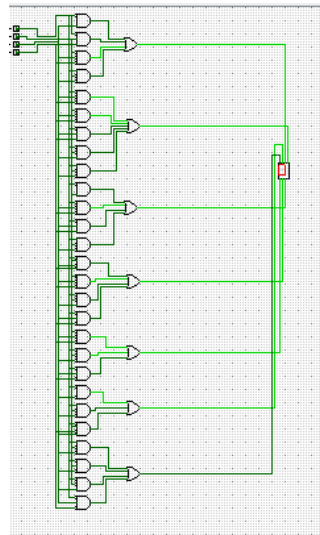
$$C = B_1 + B_2' + B_3$$

$$D = B_1'B_3' + B_2B_3' + B_1B_2'B_3 + B_1'B_2 + B_0$$

$$E = B_1'B_3' + B_2B_3'$$

$$F = B_0 + B_2'B_3' + B_1B_2' + B_1B_3'$$

$$G = B_0 + B_1B_2' + B_1'B_2 + B_2B_3'$$



## Controlador

| Estado Presente |   |   |   |  | Estado Futuro |    |    |    |
|-----------------|---|---|---|--|---------------|----|----|----|
| A               | B | C | D |  | A+            | B+ | C+ | D+ |
| 0               | 0 | 0 | 0 |  | 0             | 0  | 0  | 1  |
| 0               | 0 | 0 | 1 |  | 0             | 0  | 1  | 0  |
| 0               | 0 | 1 | 0 |  | 0             | 1  | 0  | 0  |
| 0               | 0 | 1 | 1 |  | -             | -  | -  | -  |
| 0               | 1 | 0 | 0 |  | 1             | 0  | 0  | 0  |
| 0               | 1 | 0 | 1 |  | -             | -  | -  | -  |
| 0               | 1 | 1 | 0 |  | -             | -  | -  | -  |
| 0               | 1 | 1 | 1 |  | -             | -  | -  | -  |
| 1               | 0 | 0 | 0 |  | 0             | 0  | 0  | 1  |
| 1               | 0 | 0 | 1 |  | -             | -  | -  | -  |
| 1               | 0 | 1 | 0 |  | -             | -  | -  | -  |
| 1               | 0 | 1 | 1 |  | -             | -  | -  | -  |
| 1               | 1 | 0 | 0 |  | -             | -  | -  | -  |
| 1               | 1 | 0 | 1 |  | -             | -  | -  | -  |
| 1               | 1 | 1 | 0 |  | -             | -  | -  | -  |
| 1               | 1 | 1 | 1 |  | -             | -  | -  | -  |

| Transacción |     |      |      |  | Da | Db | Dc | Dd |
|-------------|-----|------|------|--|----|----|----|----|
| A+          | B+  | C+   | D+   |  |    |    |    |    |
| 0           | 0   | 0    | UP   |  | 0  | 0  | 0  | 1  |
| 0           | 0   | UP   | DOWN |  | 0  | 0  | 1  | 0  |
| 0           | UP  | DOWN | 0    |  | 0  | 1  | 0  | 0  |
| X           | X   | X    | X    |  | X  | X  | X  | X  |
| UP          | DOW | 0    | 0    |  | 1  | 0  | 0  | 0  |
| X           | X   | X    | X    |  | X  | X  | X  | X  |
| X           | X   | X    | X    |  | X  | X  | X  | X  |
| X           | X   | X    | X    |  | X  | X  | X  | X  |
| DOW         | 0   | 0    | UP   |  | 0  | 0  | 0  | 1  |
| X           | X   | X    | X    |  | X  | X  | X  | X  |
| X           | X   | X    | X    |  | X  | X  | X  | X  |
| X           | X   | X    | X    |  | X  | X  | X  | X  |
| X           | X   | X    | X    |  | X  | X  | X  | X  |
| X           | X   | X    | X    |  | X  | X  | X  | X  |
| X           | X   | X    | X    |  | X  | X  | X  | X  |

Da = B

Db = C

Dc = D

Dd = (NOT B ) and (NOT C) and (NOT D)

# Controlador

