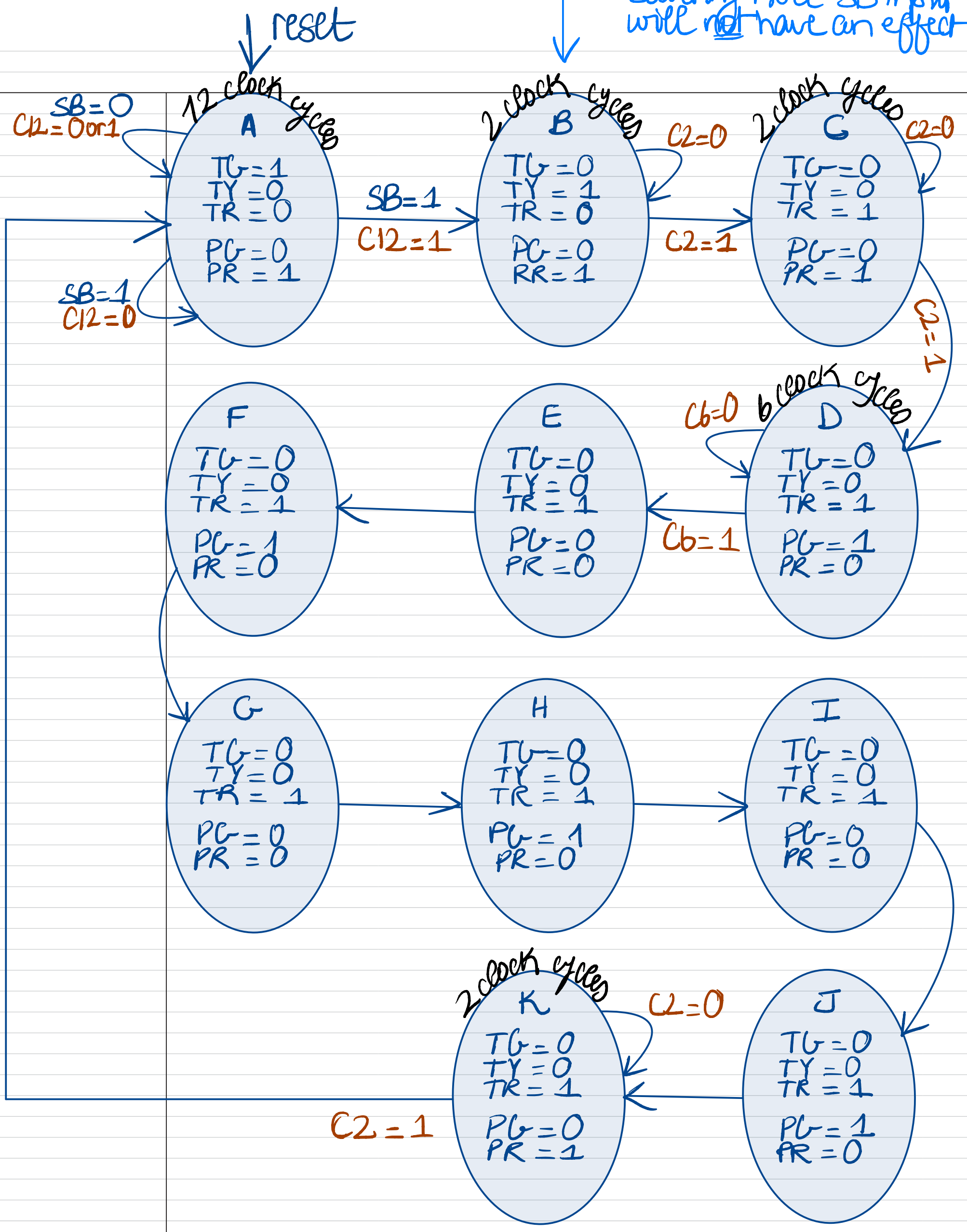



Note:
- C12: when counter counts 12 clock cycles.
- C6: when counter counts 6 clock cycles.
- C2: when counter counts 2 clock cycles.
- We are working with SB only for now to make it easier NB will be later implemented.

| Present States | | Next states dep on SB, G12, C6 & C2 | | | | | | | | | | | | | | | | Outputs | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SB = 0 | | | | | | | | SB = 1 | | | | | | | | | | | | |
| $y_{10}y_9y_8y_7y_6y_5y_4y_3y_2y_1y_0$ | | 000 | 001 | 010 | 011 | 100 | 101 | 110 | 111 | 000 | 001 | 010 | 011 | 100 | 101 | 110 | 111 | TG | TY | TR | PG | PR |
| 00 000 000 001 (12 clock cycles) | (A) | A | A | A | A | A | A | A | A | A | A | A | A | B | B | B | B | 1 | 0 | 0 | 0 | 1 |
| 00 000 000 010 (2 clock cycles) | (B) | B | C | B | C | B | C | B | C | B | C | B | C | B | C | B | C | 0 | 1 | 0 | 0 | 1 |
| 00 000 000 100 (2 clock cycles) | (C) | C | D | C | D | C | D | C | D | C | D | C | D | C | D | C | D | 0 | 0 | 1 | 0 | 1 |
| 00 000 001 000 (6 clock cycles) | (D) | D | D | E | E | D | D | F | E | D | D | E | E | D | D | E | E | 0 | 0 | 1 | 1 | 0 |
| 00 000 010 000 | (E) | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F | 0 | 0 | 1 | 0 | 0 |
| 00 000 100 000 | (F) | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | 0 | 0 | 1 | 1 | 0 |
| 00 001 000 000 | (G) | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | 0 | 0 | 1 | 0 | 0 |
| 00 010 000 000 | (H) | I | I | I | I | I | I | I | I | I | I | I | I | I | I | I | I | 0 | 0 | 1 | 1 | 0 |
| 00 100 000 000 | (I) | J | J | J | J | J | J | J | J | J | J | J | J | J | J | J | J | 0 | 0 | 1 | 0 | 0 |
| 01 000 000 000 | (J) | K | K | K | K | K | K | K | K | K | K | K | K | K | K | K | K | 0 | 0 | 1 | 1 | 0 |
| 10 000 000 000 (2 clock cycles) | (K) | K | A | K | A | K | A | K | A | K | A | K | A | K | A | K | A | 0 | 0 | 1 | 0 | 1 |

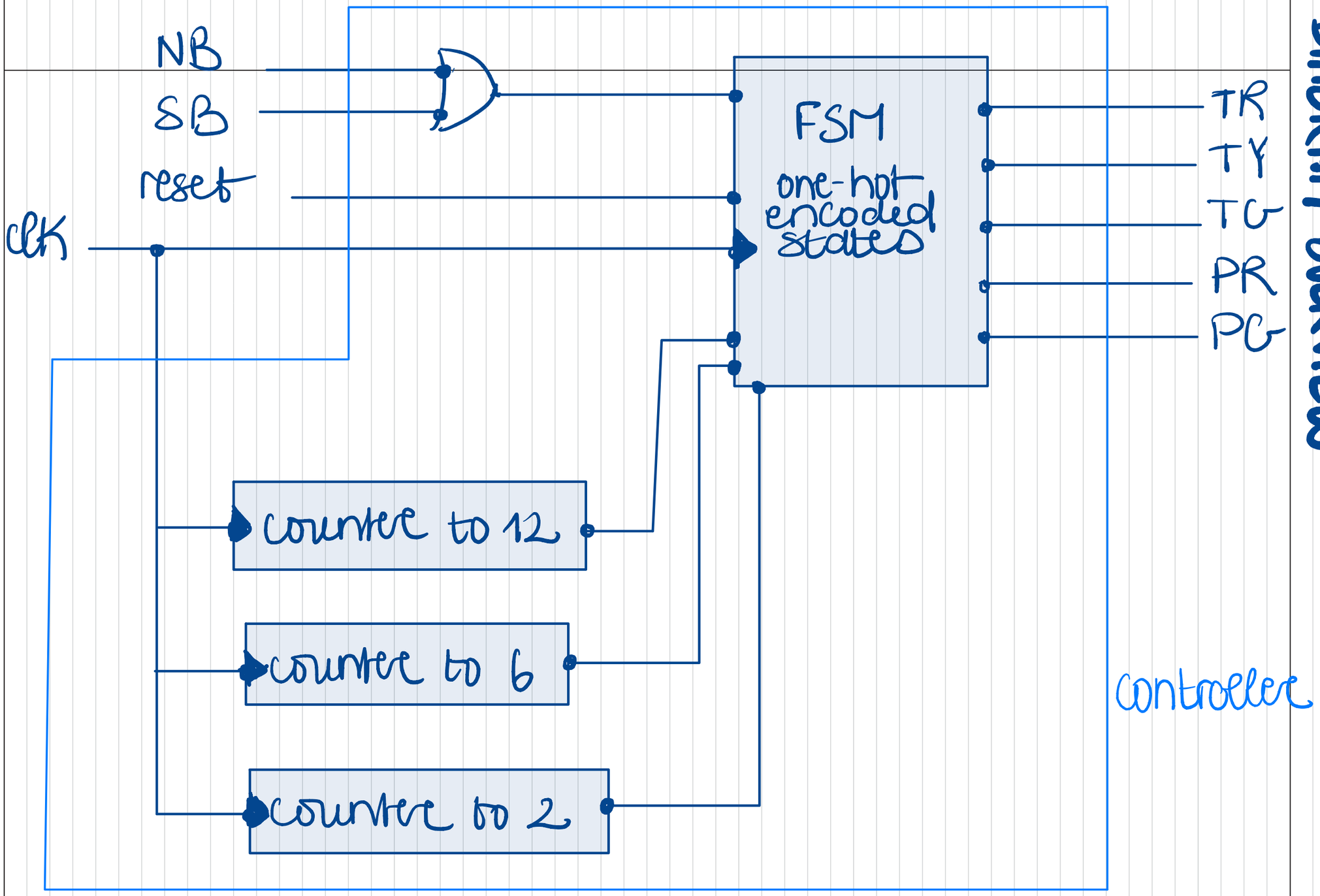
outputs →

$$\begin{cases} TC = y_0 \; ; \; TV = y_1 \; ; \; TR = y_2 + y_3 + y_4 + y_5 + \dots + y_{10} \\ PC = y_3 + y_5 + y_7 + y_9 \\ PR = y_0 + y_1 + y_2 + y_{10} \end{cases}$$

next-States where $D_i = Y_i$ (after simplification) →

- $Y_0 = y_0 . SB . \overline{C12} + y_{10} . C2$
- $Y_1 = y_0 . SB . C12 + y_1 . \overline{C2}$
- $Y_2 = y_1 . C2 + y_2 . \overline{C2}$
- $Y_3 = y_2 . C2 + y_3 . \overline{C6}$
- $Y_4 = y_3 . C6$
- $Y_5 = y_4 \; ; \; Y_6 = \overline{y_5} \; ; \; Y_7 = y_6 \; ; \; Y_8 = y_7 \; ; \; Y_9 = y_8$
- $Y_{10} = y_9 + y_{10} . C2$

# BLOCK DIAGRAM OVERVIEW



SB
NB
CEK
D0 y0
D1 y1
D2 y2
D3 y3
counter 60
12
counter 60
6
D4 y4
D5 y5
D6 y6
D7 y7
D8 y8
D9 y9
D10 y10
counter 10
2
PC
TR
PR
TY
TC