

试用 JK-trigger 设计一个同步模 6 递增计数器。

$$Q^{n+1} = \frac{I}{Q_2 Q_1 Q_0} \bar{Q}^n + \frac{K}{Q_2 Q_1 Q_0} \bar{Q}^n \dots$$

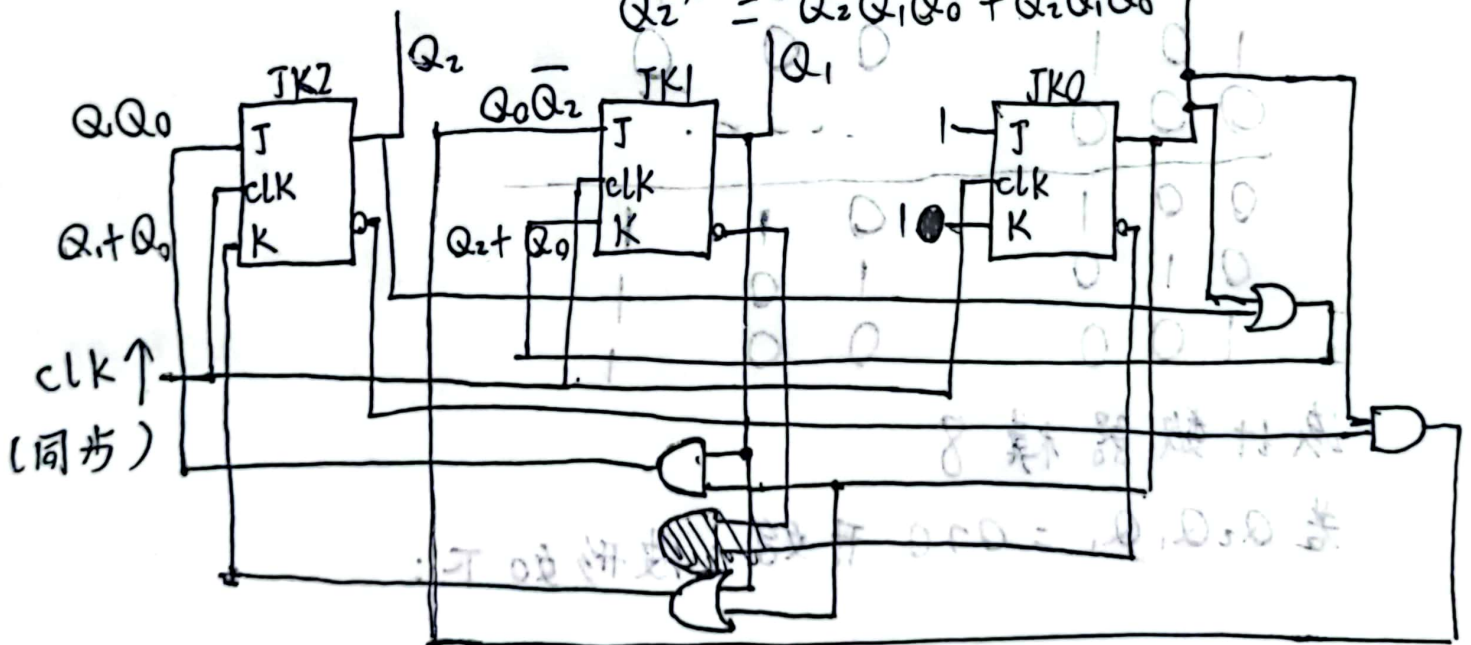
000	001
001	010
010	011
011	100
100	101
101	000

$$\begin{aligned} Q_2 &= \bar{Q}_2 \bar{Q}_1 \bar{Q}_0 + \bar{Q}_2 Q_1 \bar{Q}_0 + Q_2 \bar{Q}_1 \bar{Q}_0 \\ &= \bar{Q}_2 \bar{Q}_0 + Q_1 \bar{Q}_1 \bar{Q}_0 = \bar{Q}_0 (\bar{Q}_2 + Q_1) \\ &= \bar{Q}_2 \bar{Q}_0 + Q_1 \bar{Q}_0 \end{aligned}$$

$$Q_1^* = \overline{Q_2} (Q_1 \oplus Q_0) = \overline{Q_2} Q_0 \overline{Q_1} + \overline{Q_2} \overline{Q_0} Q_1$$

$$Q_0^* = \frac{1}{Q_0}$$

$$Q_2^* = \overline{Q_2} Q_1 Q_0 + Q_2 \overline{Q_1} \overline{Q_0} \quad | \quad Q_0$$



$$\therefore Q_2^* = Q_1 Q_0 (J) \overline{Q_2} + \overline{Q_1 + Q_0} (K) Q_2$$

\Downarrow
 $\overline{Q_1} \overline{Q_0}$

$$Q_0^* = 1 \cdot \overline{Q_0} = \overline{Q_0}$$

$$Q_1^* = \overline{Q_2 + Q_0} (\overline{K}) Q_1 + \overline{Q_2} Q_0 \overline{Q_1}$$

3. 由 74 XX 163 可知: CR 就是清零.

当 $CR = 0$ 时: 执行清零. ($CR = \overline{Q_1 Q_3} = 0 \Rightarrow Q_1 = 1$ 且 $Q_3 = 1$)
 初始 $D_3 D_2 D_1 D_0 = 0000$ (低电平)

$D_3 D_2 D_1 D_0$	$Q_3 Q_2 Q_1 Q_0$
0000	0001
0001	0010
0010	0011
0011	0100
0100	0101
0101	0110
0110	0111
0111	1000
1000	1001
1001	1010
1010	1011
1011	1100
1100	1101
1101	1110
1110	1111
1111	0000

模 11 (异步, 10 可以取到)

