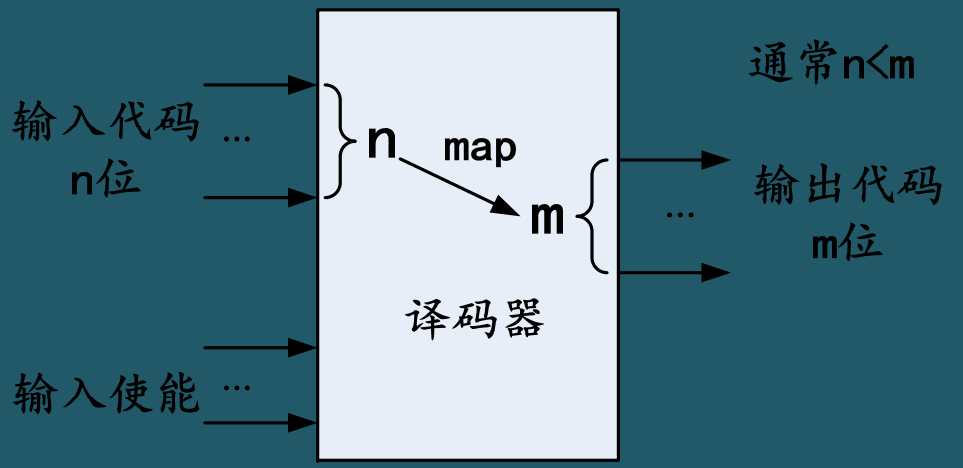
3.3 译码器功能



分类：

变量译码器　　显示译码器

二进制译码器：

n个输入端(即n位二进制码)

2^n个输出线

常见的有：

2-4译码器

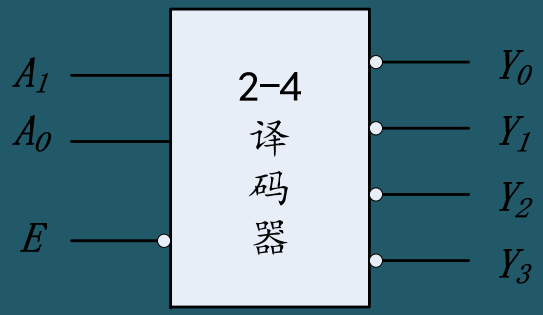
3-8译码器

4-16译码器

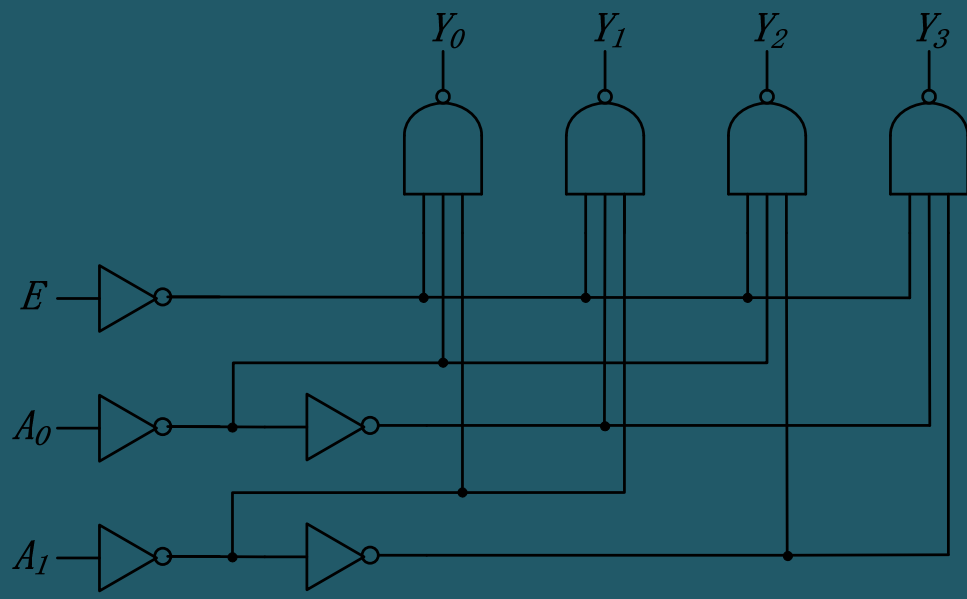
2-4译码器

2-4译码器功能表

E	A1	A0	Y0	Y1	Y2	Y3
1	X	X	1	1	1	1
0	0	0	0	1	1	1
0	0	1	1	0	1	1
0	1	0	1	1	0	1
0	1	1	1	1	1	0



2-4译码器符号图



2-4译码器逻辑电路

E	A1	A0	Y0	Y1	Y2	Y3
1	X	X	1	1	1	1
0	0	0	0	1	1	1
0	0	1	1	0	1	1
0	1	0	1	1	0	1
0	1	1	1	1	1	0

当E=0时，2-4译码器的输出函数分别为：

$$Y_0 = \overline{\overline{A_1}\,\overline{A_0}} \qquad Y_1 = \overline{\overline{A_1}A_0}$$

$$Y_2 = \overline{A_1\overline{A_0}} \qquad Y_3 = \overline{A_1 A_0}$$

$$\Rightarrow Y_i = \overline{m_i}$$

E=0时

A1	A0	Y0	Y1	Y2	Y3
0	0	0	1	1	1
0	1	1	0	1	1
1	0	1	1	0	1
1	1	1	1	1	0

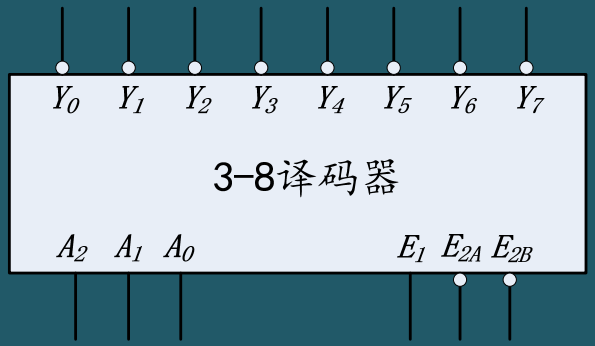
考虑上E，得到：

E	Yi
0	$\overline{m_i}$
1	1

$$Y_i = \overline{E}\,\overline{m_i} + E = E + \overline{m_i} = \overline{E m_i}$$

$$Y_i = \overline{E m_i}\,(i = 0,1,2,3)$$

3-8译码器



E1	E_{2A}+E_{2B}	A_2	A_1	A_0	Y_0	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7
0	X	X	X	X	1	1	1	1	1	1	1	1
X	1	X	X	X	1	1	1	1	1	1	1	1
1	0	0	0	0	0	1	1	1	1	1	1	1
1	0	0	0	1	1	0	1	1	1	1	1	1
1	0	0	1	0	1	1	0	1	1	1	1	1
1	0	0	1	1	1	1	1	0	1	1	1	1
1	0	1	0	0	1	1	1	1	0	1	1	1
1	0	1	0	1	1	1	1	1	1	0	1	1
1	0	1	1	0	1	1	1	1	1	1	0	1
1	0	1	1	1	1	1	1	1	1	1	1	0

推导其输出端的表达式：

$$\overline{Y_i} = E_1\overline{E_{2A}+E_{2B}}mi$$

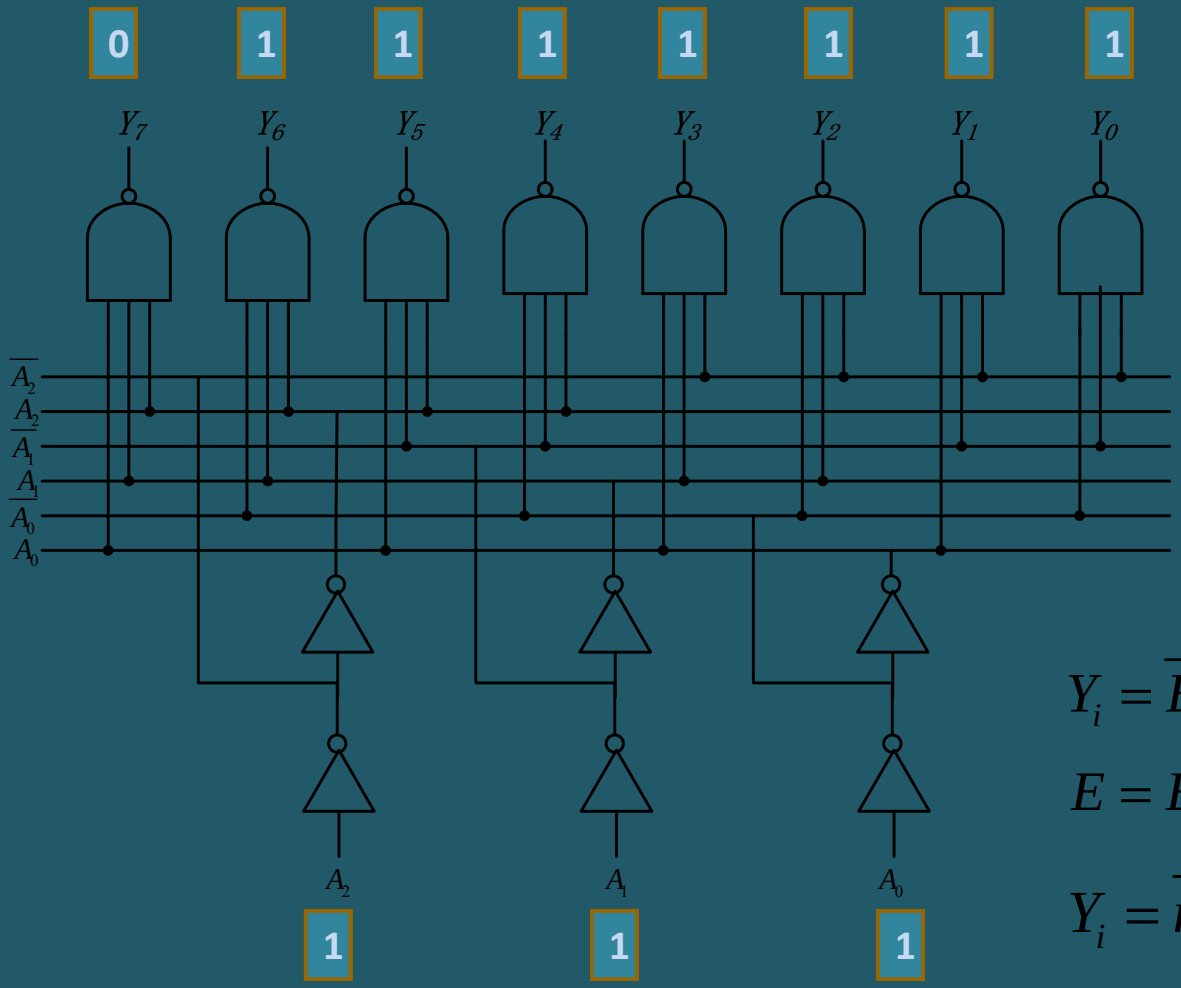
$$Y_i = \overline{Em_i}$$

$$E = E_1\overline{E_{2A}+E_{2B}} = E_1\overline{E_{2A}}\,\overline{E_{2B}}$$

3-8 译码器逻辑电路

西安电子科技大学 XIDIAN UNIVERSITY

工作原理



输出低电平有效

$$Y_i = \overline{Em_i} \qquad (i = 0 \sim 7)$$

$$E = E_1 \cdot \overline{E_{2A} + E_{2B}} = E_1 \cdot \overline{E_{2A}} \cdot \overline{E_{2B}}$$

$Y_i = \overline{m_i}$ （当E有效时）