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ФАКУЛЬТЕТ: ИНФОРМАТИКА И СИСТЕМЫ УПРАВЛЕНИЯ

КАФЕДРА: КОМПЬЮТЕРНЫЕ СИСТЕМЫ И СЕТИ

ОТЧЕТ

по лабораторной работе № 1

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1. Задание

- 1. Синтезировать мультиплексор 16-1 на логических элементах
- 2. Провести наращивание сложного мультиплексора 64-1 на 8-1
 - Каскадным способом
 - С помощью дешфратора

2. Задание 1: Синтезировать мультиплексор 16-1 на логических элементах

2.1. Таблица переходов

E_n	x_8	x_4	x_2	x_1	d_0	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8	d_9	d_{10}	d_{11}	d_{12}	d_{13}	d_{14}	d_{15}	F
0	0	0	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1	0	0	0	0	d_0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	d_0
1	0	0	0	1	×	d_1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	d_1
1	0	0	1	0	X	X	d_2	X	X	X	X	X	X	X	X	X	X	X	X	X	d_2
1	0	0	1	1	X	X	X	d_3	X	X	X	X	X	X	X	X	X	X	X	X	d_3
1	0	1	0	0	X	X	X	X	d_4	X	X	X	X	X	X	X	X	X	X	X	d_4
1	0	1	0	1	X	X	X	X	X	d_5	X	X	X	X	X	X	X	X	X	X	d_5
1	0	1	1	0	X	X	X	X	X	X	d_6	X	X	X	X	X	X	X	X	X	d_6
1	0	1	1	1	X	X	X	X	X	X	X	d_7	X	X	X	X	X	X	X	X	d_7
1	1	0	0	0	X	X	X	X	X	X	X	X	d_8	X	X	X	X	X	X	X	d_8
1	1	0	0	1	X	X	X	X	X	X	X	X	X	d_9	X	X	X	X	X	X	d_9
1	1	0	1	0	X	X	X	X	X	X	X	X	X	X	d_{10}	X	X	X	X	X	d_{10}
1	1	0	1	1	X	X	X	X	X	X	X	X	X	X	X	d_{11}	X	X	X	X	d_{11}
1	1	1	0	0	X	X	X	X	X	X	X	X	X	X	X	X	d_{12}	X	X	X	d_{12}
1	1	1	0	1	X	X	X	X	X	X	X	X	X	X	X	X	X	d_{13}	X		d_{13}
1	1	1	1	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	d_{14}		d_{14}
1	1	1	1	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	d_{15}	d_{15}

2.2. Формула

$$\begin{split} F(E_n, x_8, x_4, x_2, x_1) &= E_n(d_0 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, x_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, x_1 \vee d_2 \, \overline{x}_8 \, \overline{x}_4 \, x_2 \, \overline{x}_1 \vee d_3 \, \overline{x}_8 \, \overline{x}_4 \, x_2 x_1 \vee d_4 \, \overline{x}_8 \, x_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, x_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, x_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_8 \, \overline{x$$

2.3. Схема

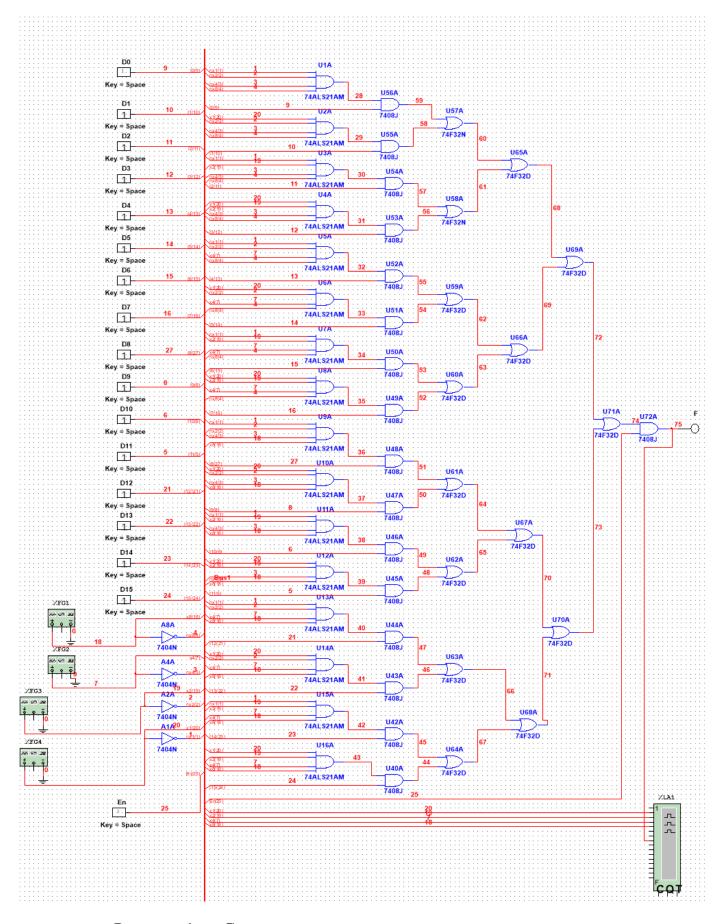


Рисунок 1 — Схема мультиплексора на логических элементах

2.4. Временная диаграмма



Рисунок 2 — Временная диаграмма мультиплексора на логических элементах

2.5. Практические и теоретические задержки

Практические задержки 119нс.

Теоретически задержки могут возникать из-за конъюнкторов, дизъюнкторов и инверторов.

$$t_{7404\mathrm{N}}=12~\mathrm{Hc}$$

$$t_{74\mathrm{ALS21AM}}=9.5~\mathrm{Hc}$$

$$t_{7408\mathrm{J}}=17.5~\mathrm{Hc}$$

$$t_{74\mathrm{F}32\mathrm{D}}=4.2~\mathrm{Hc}$$

$$T=t_{\mathrm{MH}}+t_{\mathrm{KoH}1}+4t_{\mathrm{ДИ3}}+2t_{\mathrm{KoH}2}=12+9.5+44.2+217.5=73.3~\mathrm{Hc}$$

2.6. Вывод

Был синтезирован мультиплексор на логических элементах.

3. Задание 2.1: Провести наращивание сложного мультиплексора 64-1 на 8-1 каскадным способом

3.1. Таблица переходов

E_n	$ x_{32} $	x_{16}	x_8	x_4	x_2	x_1	d_0	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8		d_{61}	d_{62}	d_{63}	F
0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	:	X	X	X	X
1	0	0	0	0	0	0	d_0	X	X	X	X	X	X	X	X	:	X	X	X	d_0
1	0	0	0	0	0	1	X	d_1	X	X	X	X	X	X	X	:	X	X	X	d_1
1	0	0	0	0	1	0	X	X	d_2	X	X	X	X	X	X	•	X	X	X	d_2
1	0	0	0	0	1	1	X	X	X	d_3	X	X	X	X	X	•	X	X	X	d_3
1	0	0	0	1	0	0	X	X	X	X	d_4	×	X	X	X	:	X	X	X	d_4
1	0	0	0	1	0	1	X	X	X	X	X	d_5	X	X	X	:	X	X	X	d_5
1	0	0	0	1	1	0	X	X	X	X	X	X	d_6	X	X	:	X	X	X	d_6
1	0	0	0	1	1	1	X	X	X	X	X	X	X	d_7	X		X	X	X	d_7
1	0	0	1	0	0	0	X	X	X	X	X	×	X	X	d_8	:	X	X	X	d_8
		•	:	:	:		:	:		:	:	:	••		:	:	••	:	:	
1	1	1	1	1	0	1	X	X	X	X	X	X	X	X	X	•••	d_{61}	X	X	d_{61}
1	1	1	1	1	1	0	X	X	X	X	X	X	X	X	X	•••		d_{62}		d_{62}
1	1	1	1	1	1	1	X	X	X	X	X	X	X	X	X	• •	X			-

3.2. Формула

$$F(E_n, x_{32}, x_{16}, x_8, x_4, x_2, x_1,$$

 $d_0,d_1,d_2,d_3,d_4,d_5,d_6,d_7,d_8,d_9,d_{10},d_{11},d_{12},d_{13},d_{14},d_{15},d_{16},d_{17},d_{18},d_{19},d_{20},\\ d_{21},d_{22},d_{23},d_{24},d_{25},d_{26},d_{27},d_{28},d_{29},d_{30},d_{31},d_{32},d_{33},d_{34},d_{35},d_{36},d_{37},d_{38},d_{39},d_{40},\\ d_{41},d_{42},d_{43},d_{44},d_{45},d_{46},d_{47},d_{48},d_{49},d_{50},d_{51},d_{52},d_{53},d_{54},d_{55},d_{56},d_{57},d_{58},d_{59},d_{60},\\$

$$d_{61}, d_{62}, d_{63}) = E_n \wedge$$

 $\wedge \ (d_0 \, \overline{x}_{32} \, \overline{x}_{16} \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, \overline{x}_1 \vee d_1 \, \overline{x}_{32} \, \overline{x}_{16} \, \overline{x}_8 \, \overline{x}_4 \, \overline{x}_2 \, x_1 \vee d_2 \, \overline{x}_{32} \, \overline{x}_{16} \, \overline{x}_8 \, \overline{x}_4 \, x_2 \, \overline{x}_1 \vee d_2 \, \overline{x}_{32} \, \overline{x}_{33} \, \overline{x}_{33} \, \overline{x}_{33} \, \overline{x}_{34} \, \overline{x}_2 \, \overline{x}_3 \vee d_3 \, \overline{x}_{33} \, \overline{x}_{34} \, \overline{x}_2 \, \overline{x}_3 \vee d_3 \vee d_$ $\lor d_3 \, \overline{x}_{32} \, \overline{x}_{16} \, \overline{x}_8 \, \overline{x}_4 \, x_2 x_1 \lor d_4 \, \overline{x}_{32} \, \overline{x}_{16} \, \overline{x}_8 \, x_4 \, \overline{x}_2 \, \overline{x}_1 \lor d_5 \, \overline{x}_{32} \, \overline{x}_{16} \, \overline{x}_8 \, x_4 \, \overline{x}_2 \, x_1 \lor d_5 \, \overline{x}_{32} \, \overline{x}_{16} \, \overline{x}_8 \, x_4 \, \overline{x}_2 \, x_1 \lor d_8 \, \overline{x}_{16} \, \overline{x}_{1$ $\vee \ d_{6} \ \overline{x}_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ x_{4} x_{2} \ \overline{x}_{1} \ \vee \ d_{7} \ \overline{x}_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ x_{4} x_{2} x_{1} \ \vee \ d_{8} \ \overline{x}_{32} \ \overline{x}_{16} \ x_{8} \ \overline{x}_{4} \ \overline{x}_{2} \ \overline{x}_{1} \ \vee \ \overline{x}_{1} \ \overline{x}_{1} \ \overline{x}_{1} \ \overline{x}_{1} \ \overline{x}_{2} \ \overline{x}_{1} \ \overline{x}_{2} \ \overline{x}_{1} \ \overline{x}_{2} \ \overline{x}_{2}$ $\vee \ d_{9} \ \overline{x}_{32} \ \overline{x}_{16} \ x_{8} \ \overline{x}_{4} \ \overline{x}_{2} \ x_{1} \lor d_{10} \ \overline{x}_{32} \ \overline{x}_{16} \ x_{8} \ \overline{x}_{4} \ x_{2} \ \overline{x}_{1} \lor d_{11} \ \overline{x}_{32} \ \overline{x}_{16} \ x_{8} \ \overline{x}_{4} \ x_{2} x_{1} \lor d_{11} \ \overline{x}_{10} \ x_{10} \ \overline{x}_{10} \ \overline{x}_{$ $\vee \ d_{12} \ \overline{x}_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \vee d_{13} \ \overline{x}_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ x_1 \vee d_{14} \ \overline{x}_{32} \ \overline{x}_{16} \ x_8 x_4 x_2 \ \overline{x}_1 \vee d_{14} \ \overline{x}_{16} \ x_8 x_4 x_2 \ \overline{x}_1 \vee d_{16} \ x_8 x_4 \ \overline{x}_1 \wedge d_{16} \$ $\vee \ d_{15} \ \overline{x}_{32} \ \overline{x}_{16} \ x_8 x_4 x_2 x_1 \vee d_{16} \ \overline{x}_{32} \ x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \vee d_{17} \ \overline{x}_{32} \ x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ x_1 \vee d_{17} \ \overline{x}_{18} \ \overline{x$ $\vee \ d_{18} \ \overline{x}_{32} \ x_{16} \ \overline{x}_{8} \ \overline{x}_{4} \ x_{2} \ \overline{x}_{1} \ \vee \ d_{19} \ \overline{x}_{32} \ x_{16} \ \overline{x}_{8} \ \overline{x}_{4} \ x_{2} x_{1} \ \vee \ d_{20} \ \overline{x}_{32} \ x_{16} \ \overline{x}_{8} \ x_{4} \ \overline{x}_{2} \ \overline{x}_{1} \ \vee \ d_{20} \ \overline{x}_{20} \$ $\vee \ d_{21} \ \overline{x}_{32} \ x_{16} \ \overline{x}_{8} \ x_{4} \ \overline{x}_{2} \ x_{1} \lor d_{22} \ \overline{x}_{32} \ x_{16} \ \overline{x}_{8} \ x_{4} x_{2} \ \overline{x}_{1} \lor d_{23} \ \overline{x}_{32} \ x_{16} \ \overline{x}_{8} \ x_{4} x_{2} x_{1} \lor d_{23} \ \overline{x}_{22} \ x_{23} \ x_{24} \ x_{24} \ x_{24} \ x_{25} \ x_{25}$ $\vee\ d_{24}\ \overline{x}_{32}\ x_{16}x_{8}\ \overline{x}_{4}\ \overline{x}_{2}\ \overline{x}_{1}\ \vee\ d_{25}\ \overline{x}_{32}\ x_{16}x_{8}\ \overline{x}_{4}\ \overline{x}_{2}\ x_{1}\ \vee\ d_{26}\ \overline{x}_{32}\ x_{16}x_{8}\ \overline{x}_{4}\ x_{2}\ \overline{x}_{1}\ \vee\ d_{26}\ \overline{x}_{32}\ x_{16}x_{8}\ \overline{x}_{4}\ x_{2}\ \overline{x}_{1}\ \vee\ d_{26}\ \overline{x}_{26}x_{$ $\vee \ d_{27} \ \overline{x}_{32} \ x_{16} x_8 \ \overline{x}_4 \ x_2 x_1 \ \vee \ d_{28} \ \overline{x}_{32} \ x_{16} x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{29} \ \overline{x}_{32} \ x_{16} x_8 x_4 \ \overline{x}_2 \ x_1 \ \vee \ d_{29} \ \overline{x}_{20} \ x_{20} \$ $\vee\ d_{30}\ \overline{x}_{32}\ x_{16}x_8x_4x_2\ \overline{x}_1\ \vee\ d_{31}\ \overline{x}_{32}\ x_{16}x_8x_4x_2x_1\ \vee\ d_{32}x_{32}\ \overline{x}_{16}\ \overline{x}_8\ \overline{x}_4\ \overline{x}_2\ \overline{x}_1\ \vee\ d_{32}x_{32}\ \overline{x}_{16}\ \overline{x}_8\ \overline{x}_4\ \overline{x}_2\ \overline{x}_1\ \vee\ d_{32}x_3x_3x_4x_2x_1$ $\vee \ d_{33}x_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ \overline{x}_{4} \ \overline{x}_{2} \ x_{1} \lor d_{34}x_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ \overline{x}_{4} \ x_{2} \ \overline{x}_{1} \lor d_{35}x_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ \overline{x}_{4} \ x_{2}x_{1} \lor d_{35}x_{32} \ \overline{x}_{16} \ \overline{x$ $\vee \ d_{36}x_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ x_{4} \ \overline{x}_{2} \ \overline{x}_{1} \lor d_{37}x_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ x_{4} \ \overline{x}_{2} \ x_{1} \lor d_{38}x_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ x_{4}x_{2} \ \overline{x}_{1} \lor d_{38}x_{32} \ \overline{x}_{16} \ \overline{x}_{$ $\vee \ d_{39}x_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ x_{4}x_{2}x_{1} \vee d_{40}x_{32} \ \overline{x}_{16} \ x_{8} \ \overline{x}_{4} \ \overline{x}_{2} \ \overline{x}_{1} \vee d_{41}x_{32} \ \overline{x}_{16} \ x_{8} \ \overline{x}_{4} \ \overline{x}_{2} \ x_{1} \vee d_{41}x_{32} \ \overline{x}_{16} \ x_{8} \ \overline{x}_{4} \ \overline{x}_{2} \ x_{1} \vee d_{41}x_{32} \ \overline{x}_{16} \ x_{10} \ x_{10} \ x_{10} \ x_{10} \vee d_{10} \ x_{10} \ x_{1$ $\vee \ d_{42}x_{32} \ \overline{x}_{16} \ x_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{43}x_{32} \ \overline{x}_{16} \ x_8 \ \overline{x}_4 \ x_2 x_1 \ \vee \ d_{44}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{42}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{43}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{44}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{44}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{44}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{44}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{44}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{44}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{44}x_{43} \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{44}x_{43} \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_3 \$ $\vee \ d_{45}x_{32} \ \overline{x}_{16} \ x_8x_4 \ \overline{x}_2 \ x_1 \vee d_{46}x_{32} \ \overline{x}_{16} \ x_8x_4x_2 \ \overline{x}_1 \vee d_{47}x_{32} \ \overline{x}_{16} \ x_8x_4x_2x_1 \vee d_{47}x_{47} \ \overline{x}_{16} \ x_8x_4x_2x_1 \vee d_{47}x_{47} \ \overline{x}_{18} \ x_{18}x_4x_2x_1 \vee d_{48}x_1 + d_{48}x_1 + d_{48}x_2 + d_{48}x_1 +$ $\vee \ d_{48}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{49}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ x_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_1 \ \overline{x}_2 \ \overline{x}_1 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_1 \ \overline{x}_2 \ \overline{x}_1 \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_1 \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_1 \ \overline{x}_2 \$ $\lor d_{51}x_{32}x_{16}\, \overline{x}_{8}\, \overline{x}_{4}\, x_{2}x_{1} \lor d_{52}x_{32}x_{16}\, \overline{x}_{8}\, x_{4}\, \overline{x}_{2}\, \overline{x}_{1} \lor d_{53}x_{32}x_{16}\, \overline{x}_{8}\, x_{4}\, \overline{x}_{2}\, x_{1} \lor d_{53}x_{23}x_{16}\, \overline{x}_{8}\, x_{4}\, \overline{x}_{2}\, x_{1} \lor d_{53}x_{23}x_{16}\, \overline{x}_{8}\, x_{2}\, x_{2}$ $\vee\ d_{54}x_{32}x_{16}\,\overline{x}_{8}\,x_{4}x_{2}\,\overline{x}_{1}\,\vee\ d_{55}x_{32}x_{16}\,\overline{x}_{8}\,x_{4}x_{2}x_{1}\,\vee\ d_{56}x_{32}x_{16}x_{8}\,\overline{x}_{4}\,\overline{x}_{2}\,\overline{x}_{1}\,\vee$ $\vee\ d_{57}x_{32}x_{16}x_8\ \overline{x}_4\ \overline{x}_2\ x_1 \vee d_{58}x_{32}x_{16}x_8\ \overline{x}_4\ x_2\ \overline{x}_1 \vee d_{59}x_{32}x_{16}x_8\ \overline{x}_4\ x_2x_1 \vee d_{59}x_{16}x_8\ \overline{x}_4\ x_2x_1 \vee d_{59}x_{16}x_1 \vee d_{59}x_{16}x_1 \vee d_{59}x_1 \vee d_{59$ $\vee \ d_{60}x_{32}x_{16}x_{8}x_{4}\ \overline{x}_{2}\ \overline{x}_{1} \vee d_{61}x_{32}x_{16}x_{8}x_{4}\ \overline{x}_{2}\ x_{1} \vee d_{62}x_{32}x_{16}x_{8}x_{4}x_{2}\ \overline{x}_{1} \vee \\$ $\vee d_{63}x_{32}x_{16}x_8x_4x_2x_1)$

3.3. Схема

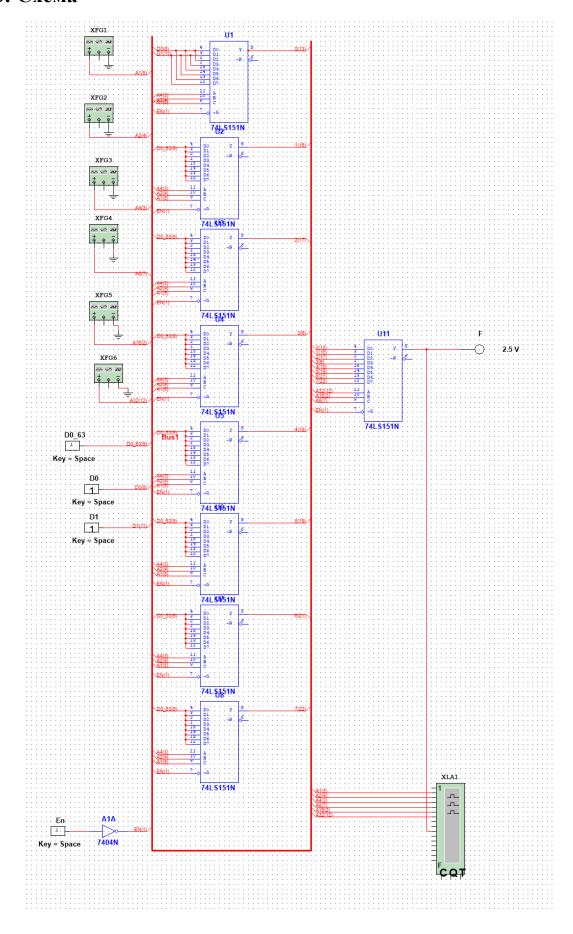


Рисунок 3 — Схема нарощенного мультиплексора

3.4. Временная диаграмма

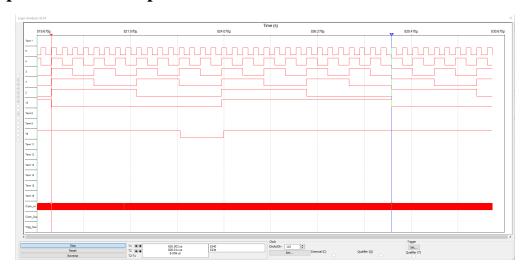


Рисунок 4 — Временная диаграмма нарощенного мультиплексора

3.5. Практические и теоретические задержки

Теоретически задержки могут возникать из-за мультиплексора и инвентора.

$$t_{74
m LS151N} = 26 \,\,{
m Hc}$$
 $T = t_{
m \scriptscriptstyle MH} + 2 t_{
m \scriptscriptstyle MYJ} = 12 + 226 = 64 \,\,{
m Hc}$

3.6. Вывод

Было произведено наращивание сложного мультиплексора 64-1 на 8-1 каскадным способом

4. Задание 2.2: Провести наращивание сложного мультиплексора 64-1 на 8-1 с помощью дешифратора

4.1. Таблица переходов

E_n	x_{32}	x_{16}	x_8	x_4	x_2	x_1	d_0	d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8		d_{61}	d_{62}	d_{63}	F
0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	•••	X	X	X	X
1	0	0	0	0	0	0	d_0	X	X	X	X	X	X	X	X	:	X	X	X	d_0
1	0	0	0	0	0	1	X	d_1	X	X	X	X	X	X	X	:	X	X	X	d_1
1	0	0	0	0	1	0	X	X	d_2	X	X	X	X	X	X	•	X	X	X	d_2
1	0	0	0	0	1	1	X	X	X	d_3	X	×	X	X	X	:	X	X	X	d_3
1	0	0	0	1	0	0	X	X	X	X	d_4	×	X	X	X	:	X	X	X	d_4
1	0	0	0	1	0	1	X	X	X	X	X	d_5	X	X	X	:	X	X	X	d_5
1	0	0	0	1	1	0	X	X	X	X	X	X	d_6	X	X	:	X	X	X	d_6
1	0	0	0	1	1	1	X	X	X	X	X	X	X	d_7	X	:	X	X	X	d_7
1	0	0	1	0	0	0	X	X	X	X	X	X	X	X	d_8	:	X	X	X	d_8
		••			•	•••		•••		•••	•••	•	•••		•••	•	•••	•••	•••	•••
1	1	1	1	1	0	1	X	X	X	X	X	X	X	X	X	•	d_{61}	X	X	d_{61}
1	1	1	1	1	1	0	X	X	X	X	X	X	X	X	X	:		d_{62}	X	d_{62}
1	1	1	1	1	1	1	X	X	X	X	X	X	X	X	X		X		_	d_{63}

4.2. Формула

$$F(E_n, x_{32}, x_{16}, x_8, x_4, x_2, x_1,$$

 $d_0,d_1,d_2,d_3,d_4,d_5,d_6,d_7,d_8,d_9,d_{10},d_{11},d_{12},d_{13},d_{14},d_{15},d_{16},d_{17},d_{18},d_{19},d_{20},\\ d_{21},d_{22},d_{23},d_{24},d_{25},d_{26},d_{27},d_{28},d_{29},d_{30},d_{31},d_{32},d_{33},d_{34},d_{35},d_{36},d_{37},d_{38},d_{39},d_{40},\\ d_{41},d_{42},d_{43},d_{44},d_{45},d_{46},d_{47},d_{48},d_{49},d_{50},d_{51},d_{52},d_{53},d_{54},d_{55},d_{56},d_{57},d_{58},d_{59},d_{60},\\ d_{41},d_{42},d_{43},d_{44},d_{45},d_{46},d_{47},d_{48},d_{49},d_{50},d_{51},d_{52},d_{53},d_{54},d_{55},d_{56},d_{57},d_{58},d_{59},d_{60},\\ d_{41},d_{42},d_{43},d_{44},d_{45},d_{46},d_{47},d_{48},d_{49},d_{50},d_{51},d_{52},d_{53},d_{54},d_{55},d_{56},d_{57},d_{58},d_{59},d_{60},\\ d_{41},d_{42},d_{43},d_{44},d_{45},d_{46},d_{47},d_{48},d_{49},d_{50},d_{51},d_{52},d_{53},d_{54},d_{55},d_{56},d_{57},d_{58},d_{59},d_{60},\\ d_{41},d_{42},d_{43},d_{44},d_{45},d_{46},d_{47},d_{48},d_{49},d_{50},d_{51},d_{52},d_{53},d_{54},d_{55},d_{56},d_{57},d_{58},d_{59},d_{60},\\ d_{41},d_{42},d_{43},d_{44},d_{45},d_{46},d_{47},d_{48},d_{49},d_{50},d_{51},d_{52},d_{53},d_{54},d_{55},d_{56},d_{57},d_{58},d_{59},d_{60},\\ d_{41},d_{42},d_{43},d_{44},d_{45},d_{46},d_{47},d_{48},d_{49},d_{50},d_{51},d_{52},d_{53},d_{54},d_{55},d_{56},d_{57},d_{58},d_{59},d_{60},\\ d_{41},d_{42},d_{43},d_{44},d_{45},d_{46},d_{47},d_{48},d_{49},d_{50},d_{51},d_{52},d_{53},d_{54},d_{55},d_{56},d_{57},d_{58},d_{59},d_{60},\\ d_{41},d_{42},d_{43},d_{44},d_{45},d_{46},d_{47},d_{48},d_{49},d_{50},d_{51},d_{52},d_{53},d_{54},d_{55},d_{56},d_{57},d_{58},d_{59},d_{$

$$d_{61}, d_{62}, d_{63}) = E_n \land$$

 $\wedge \ (d_0 \ \overline{x}_{32} \ \overline{x}_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \lor d_1 \ \overline{x}_{32} \ \overline{x}_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ x_1 \lor d_2 \ \overline{x}_{32} \ \overline{x}_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \lor d_2 \ \overline{x}_{22} \ \overline{x}_{23} \ \overline{x}_{23} \ \overline{x}_{23} \ \overline{x}_{24} \ \overline{x}_2 \ \overline{x}_{24} \ \overline{x}_{25} \ \overline{x}_{25$ $\lor d_3 \, \overline{x}_{32} \, \overline{x}_{16} \, \overline{x}_8 \, \overline{x}_4 \, x_2 x_1 \lor d_4 \, \overline{x}_{32} \, \overline{x}_{16} \, \overline{x}_8 \, x_4 \, \overline{x}_2 \, \overline{x}_1 \lor d_5 \, \overline{x}_{32} \, \overline{x}_{16} \, \overline{x}_8 \, x_4 \, \overline{x}_2 \, x_1 \lor d_5 \, \overline{x}_{32} \, \overline{x}_{16} \, \overline{x}_8 \, x_4 \, \overline{x}_2 \, x_1 \lor d_8 \, \overline{x}_{16} \, \overline{x}_{1$ $\vee \ d_{6} \ \overline{x}_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ x_{4} x_{2} \ \overline{x}_{1} \ \vee \ d_{7} \ \overline{x}_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ x_{4} x_{2} x_{1} \ \vee \ d_{8} \ \overline{x}_{32} \ \overline{x}_{16} \ x_{8} \ \overline{x}_{4} \ \overline{x}_{2} \ \overline{x}_{1} \ \vee \ \overline{x}_{1} \ \overline{x}_{1} \ \overline{x}_{1} \ \overline{x}_{1} \ \overline{x}_{2} \ \overline{x}_{1} \ \overline{x}_{2} \ \overline{x}_{1} \ \overline{x}_{2} \ \overline{x}_{2}$ $\vee \ d_{9} \ \overline{x}_{32} \ \overline{x}_{16} \ x_{8} \ \overline{x}_{4} \ \overline{x}_{2} \ x_{1} \lor d_{10} \ \overline{x}_{32} \ \overline{x}_{16} \ x_{8} \ \overline{x}_{4} \ x_{2} \ \overline{x}_{1} \lor d_{11} \ \overline{x}_{32} \ \overline{x}_{16} \ x_{8} \ \overline{x}_{4} \ x_{2} x_{1} \lor$ $\vee \ d_{12} \ \overline{x}_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \vee d_{13} \ \overline{x}_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ x_1 \vee d_{14} \ \overline{x}_{32} \ \overline{x}_{16} \ x_8 x_4 x_2 \ \overline{x}_1 \vee d_{14} \ \overline{x}_{16} \ x_8 x_4 x_2 \ \overline{x}_1 \vee d_{16} \ x_8 x_4 \ \overline{x}_1 \wedge d_{16} \$ $\vee \ d_{15} \ \overline{x}_{32} \ \overline{x}_{16} \ x_8 x_4 x_2 x_1 \vee d_{16} \ \overline{x}_{32} \ x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \vee d_{17} \ \overline{x}_{32} \ x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ x_1 \vee d_{17} \ \overline{x}_{18} \ \overline{x$ $\vee \ d_{18} \ \overline{x}_{32} \ x_{16} \ \overline{x}_{8} \ \overline{x}_{4} \ x_{2} \ \overline{x}_{1} \ \vee \ d_{19} \ \overline{x}_{32} \ x_{16} \ \overline{x}_{8} \ \overline{x}_{4} \ x_{2} x_{1} \ \vee \ d_{20} \ \overline{x}_{32} \ x_{16} \ \overline{x}_{8} \ x_{4} \ \overline{x}_{2} \ \overline{x}_{1} \ \vee \ d_{20} \ \overline{x}_{20} \$ $\vee \ d_{21} \ \overline{x}_{32} \ x_{16} \ \overline{x}_{8} \ x_{4} \ \overline{x}_{2} \ x_{1} \lor d_{22} \ \overline{x}_{32} \ x_{16} \ \overline{x}_{8} \ x_{4} x_{2} \ \overline{x}_{1} \lor d_{23} \ \overline{x}_{32} \ x_{16} \ \overline{x}_{8} \ x_{4} x_{2} x_{1} \lor d_{23} \ \overline{x}_{22} \ x_{23} \ x_{24} \ x_{24} \ x_{24} \ x_{25} \ x_{25}$ $\vee\ d_{24}\ \overline{x}_{32}\ x_{16}x_{8}\ \overline{x}_{4}\ \overline{x}_{2}\ \overline{x}_{1}\ \vee\ d_{25}\ \overline{x}_{32}\ x_{16}x_{8}\ \overline{x}_{4}\ \overline{x}_{2}\ x_{1}\ \vee\ d_{26}\ \overline{x}_{32}\ x_{16}x_{8}\ \overline{x}_{4}\ x_{2}\ \overline{x}_{1}\ \vee\ d_{26}\ \overline{x}_{32}\ x_{16}x_{8}\ \overline{x}_{4}\ x_{2}\ \overline{x}_{1}\ \vee\ d_{26}\ \overline{x}_{26}x_{$ $\vee \ d_{27} \ \overline{x}_{32} \ x_{16} x_8 \ \overline{x}_4 \ x_2 x_1 \ \vee \ d_{28} \ \overline{x}_{32} \ x_{16} x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{29} \ \overline{x}_{32} \ x_{16} x_8 x_4 \ \overline{x}_2 \ x_1 \ \vee \ d_{29} \ \overline{x}_{20} \ x_{20} \$ $\vee\ d_{30}\ \overline{x}_{32}\ x_{16}x_8x_4x_2\ \overline{x}_1\ \vee\ d_{31}\ \overline{x}_{32}\ x_{16}x_8x_4x_2x_1\ \vee\ d_{32}x_{32}\ \overline{x}_{16}\ \overline{x}_8\ \overline{x}_4\ \overline{x}_2\ \overline{x}_1\ \vee\ d_{32}x_{32}\ \overline{x}_{16}\ \overline{x}_8\ \overline{x}_4\ \overline{x}_2\ \overline{x}_1\ \vee\ d_{32}x_3x_3x_4x_2x_1$ $\vee \ d_{33}x_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ \overline{x}_{4} \ \overline{x}_{2} \ x_{1} \lor d_{34}x_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ \overline{x}_{4} \ x_{2} \ \overline{x}_{1} \lor d_{35}x_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ \overline{x}_{4} \ x_{2}x_{1} \lor d_{35}x_{32} \ \overline{x}_{16} \ \overline{x$ $\vee \ d_{36}x_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ x_{4} \ \overline{x}_{2} \ \overline{x}_{1} \lor d_{37}x_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ x_{4} \ \overline{x}_{2} \ x_{1} \lor d_{38}x_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ x_{4}x_{2} \ \overline{x}_{1} \lor d_{38}x_{32} \ \overline{x}_{16} \ \overline{x}_{$ $\vee \ d_{39}x_{32} \ \overline{x}_{16} \ \overline{x}_{8} \ x_{4}x_{2}x_{1} \vee d_{40}x_{32} \ \overline{x}_{16} \ x_{8} \ \overline{x}_{4} \ \overline{x}_{2} \ \overline{x}_{1} \vee d_{41}x_{32} \ \overline{x}_{16} \ x_{8} \ \overline{x}_{4} \ \overline{x}_{2} \ x_{1} \vee d_{41}x_{32} \ \overline{x}_{16} \ x_{8} \ \overline{x}_{4} \ \overline{x}_{2} \ x_{1} \vee d_{41}x_{32} \ \overline{x}_{16} \ x_{10} \ x_{10} \ x_{10} \ x_{10} \vee d_{10} \ x_{10} \ x_{1$ $\vee \ d_{42}x_{32} \ \overline{x}_{16} \ x_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{43}x_{32} \ \overline{x}_{16} \ x_8 \ \overline{x}_4 \ x_2 x_1 \ \vee \ d_{44}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{42}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{43}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{44}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{44}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{44}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{44}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{44}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{44}x_{32} \ \overline{x}_{16} \ x_8 x_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{44}x_{43} \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{44}x_{43} \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_3 \$ $\vee \ d_{45}x_{32} \ \overline{x}_{16} \ x_8x_4 \ \overline{x}_2 \ x_1 \vee d_{46}x_{32} \ \overline{x}_{16} \ x_8x_4x_2 \ \overline{x}_1 \vee d_{47}x_{32} \ \overline{x}_{16} \ x_8x_4x_2x_1 \vee d_{47}x_{47} \ \overline{x}_{16} \ x_8x_4x_2x_1 \vee d_{47}x_{47} \ \overline{x}_{18} \ x_{18}x_4x_2x_1 \vee d_{48}x_1 + d_{48}x_1 + d_{48}x_2 + d_{48}x_1 +$ $\vee \ d_{48}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{49}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ x_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{32}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ x_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_8 \ \overline{x}_4 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_1 \ \overline{x}_2 \ \overline{x}_1 \ \overline{x}_2 \ \overline{x}_1 \ \vee \ d_{50}x_{16} \ \overline{x}_1 \ \overline{x}_2 \ \overline{x}_1 \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_1 \ \overline{x}_2 \ \overline{x}_2 \ \overline{x}_1 \ \overline{x}_2 \$ $\lor d_{51}x_{32}x_{16}\, \overline{x}_{8}\, \overline{x}_{4}\, x_{2}x_{1} \lor d_{52}x_{32}x_{16}\, \overline{x}_{8}\, x_{4}\, \overline{x}_{2}\, \overline{x}_{1} \lor d_{53}x_{32}x_{16}\, \overline{x}_{8}\, x_{4}\, \overline{x}_{2}\, x_{1} \lor d_{53}x_{23}x_{16}\, \overline{x}_{8}\, x_{4}\, \overline{x}_{2}\, x_{1} \lor d_{53}x_{23}x_{16}\, \overline{x}_{8}\, x_{2}\, x_{2}$ $\vee\ d_{54}x_{32}x_{16}\,\overline{x}_{8}\,x_{4}x_{2}\,\overline{x}_{1}\,\vee\ d_{55}x_{32}x_{16}\,\overline{x}_{8}\,x_{4}x_{2}x_{1}\,\vee\ d_{56}x_{32}x_{16}x_{8}\,\overline{x}_{4}\,\overline{x}_{2}\,\overline{x}_{1}\,\vee$ $\vee\ d_{57}x_{32}x_{16}x_8\ \overline{x}_4\ \overline{x}_2\ x_1 \vee d_{58}x_{32}x_{16}x_8\ \overline{x}_4\ x_2\ \overline{x}_1 \vee d_{59}x_{32}x_{16}x_8\ \overline{x}_4\ x_2x_1 \vee d_{59}x_{16}x_8\ \overline{x}_4\ x_2x_1 \vee d_{59}x_{16}x_1 \vee d_{59}x_{16}x_1 \vee d_{59}x_1 \vee d_{59$ $\vee \ d_{60}x_{32}x_{16}x_{8}x_{4}\ \overline{x}_{2}\ \overline{x}_{1} \vee d_{61}x_{32}x_{16}x_{8}x_{4}\ \overline{x}_{2}\ x_{1} \vee d_{62}x_{32}x_{16}x_{8}x_{4}x_{2}\ \overline{x}_{1} \vee \\$ $\vee d_{63}x_{32}x_{16}x_8x_4x_2x_1)$

4.3. Схема

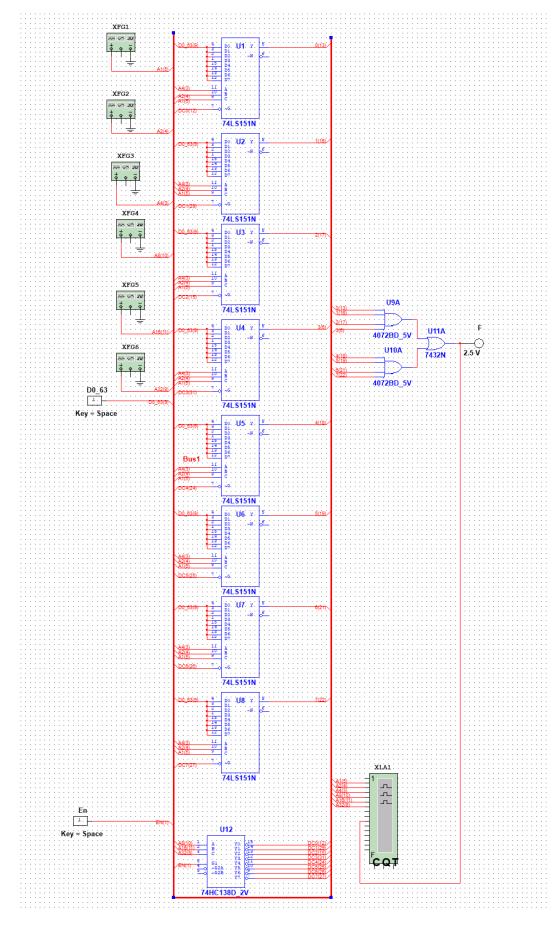


Рисунок 5 — Схема нарощенного мультиплексора

4.4. Временная диаграмма

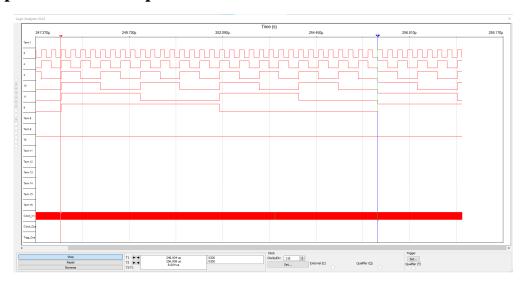


Рисунок 6 — Временная диаграмма нарощенного мультиплексора

4.5. Практические и теоретические задержки

Практическая задержка 100 нс.

Теоретически задержки могут возникать из-за дешифратора мультиплексора и дизъюнкторов.

$$t_{\rm деш}=41~{\rm Hc}$$

$$t_{\rm мул}=26~{\rm Hc}$$

$$t_{\rm диз1}=60~{\rm Hc}$$

$$t_{\rm диз2}=4~{\rm Hc}$$

$$T=t_{\rm деш}+t_{\rm мул}+t_{\rm диз}+t_{\rm диз2}=41+26+60+4=131~{\rm Hc}$$

4.6. Вывод

Было произведено наращивание сложного мультиплексора 64-1 на 8-1 с помощью дешифратора