

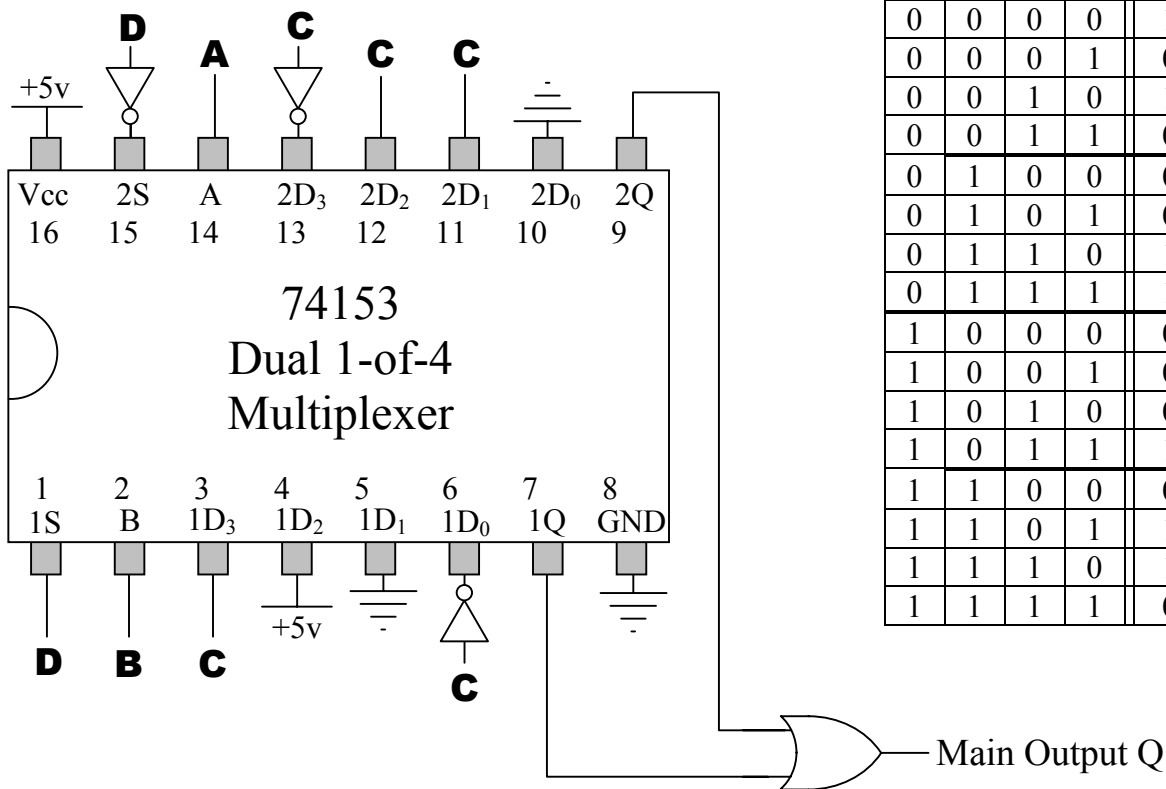
Multiplexer Quadrupling

Using the 74153 MUX to Generate a 16 row Truth Table

The 74153 MUX has two separate 2-input/4-row MUXs on it. To create a single 16-row truth table, we can start by implementing *parts* of the table on different MUXs, and then combining the two separate outputs into one output. We'll turn on only the MUX needed using the STROBES. The multiple outputs are combined with an OR gate. Remember, each strobe turns its MUX on when it is *low*.

On each MUX, we have to use the MUX doubling technique to fit a 3-input/8-row truth table onto a 2-input/4-row MUX.

The circuit shown will generate the accompanying truth table. Besides the 74153 MUX, it requires two inverters (\bar{C} and \bar{D}), and one two-input OR gate.



D	C	B	A	Q	D _i
0	0	0	0	1	1D ₀
0	0	0	1	0	1D ₁
0	0	1	0	1	1D ₂
0	0	1	1	0	1D ₃
0	1	0	0	0	1D ₀
0	1	0	1	0	1D ₁
0	1	1	0	1	1D ₂
0	1	1	1	1	1D ₃
1	0	0	0	0	2D ₀
1	0	0	1	0	2D ₁
1	0	1	0	0	2D ₂
1	0	1	1	1	2D ₃
1	1	0	0	0	2D ₀
1	1	0	1	1	2D ₁
1	1	1	0	1	2D ₂
1	1	1	1	0	2D ₃