

New topic: Multiplexers, Decoders, and Programmable

Data inputs Logic Devices

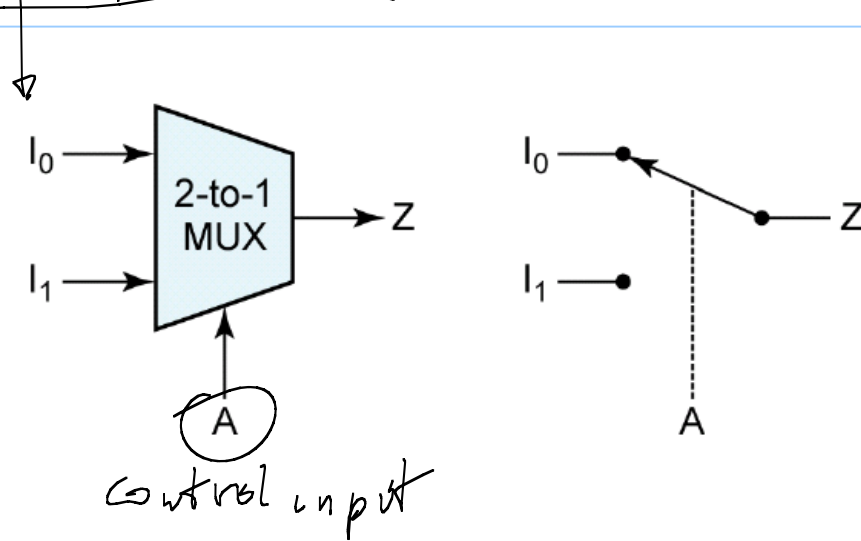


Figure 9-1: 2-to-1 Multiplexer and Switch Analog

Multiplexers and Decoders are examples of medium-scale integrated circuits (MSI circuits), which contain 12-100 gates in one package (one "chip").

LSI (Large-scale integrated) circuits: ~100 - several thousand,

VLSI: from several thousands up

A multiplexer (MUX) is also called a data selector,

$$Z = A' I_0 + A I_1$$

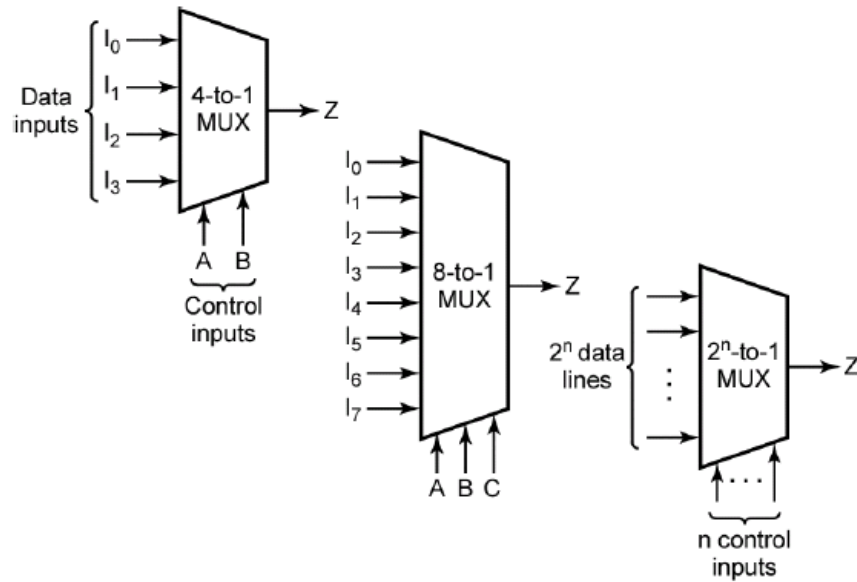


Figure 9-2: Multiplexers

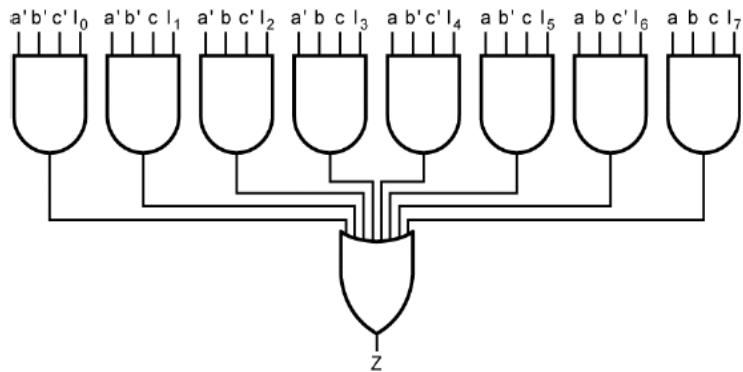


Figure 9-3: Logic Diagram for 8-to-1 MUX

4-to-1 MUX: (9-1)

$$Z = A'B'I_0 + A'BI_1 + AB'I_2 + ABI_3$$

8-to-1 MUX:

$$Z = A'B'C'I_0 + A'B'CI_1 + A'BC'I_2 + \dots + ABCI_7$$

2^n -to-1 MUX:

$$Z = \sum_{k=0}^{2^n-1} m_k I_k$$

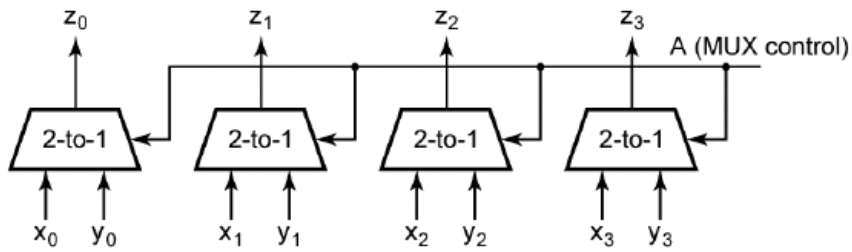


Figure 9-4: Quad Multiplexer Used to Select Data

→ shorthand ↴

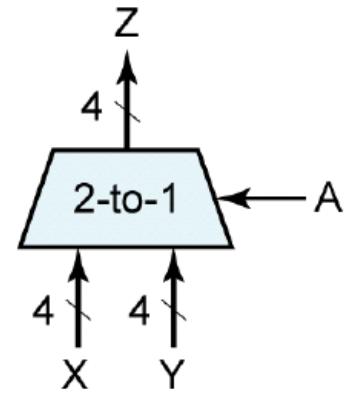


Figure 9-5: Quad Multiplexer with Bus Inputs and Output