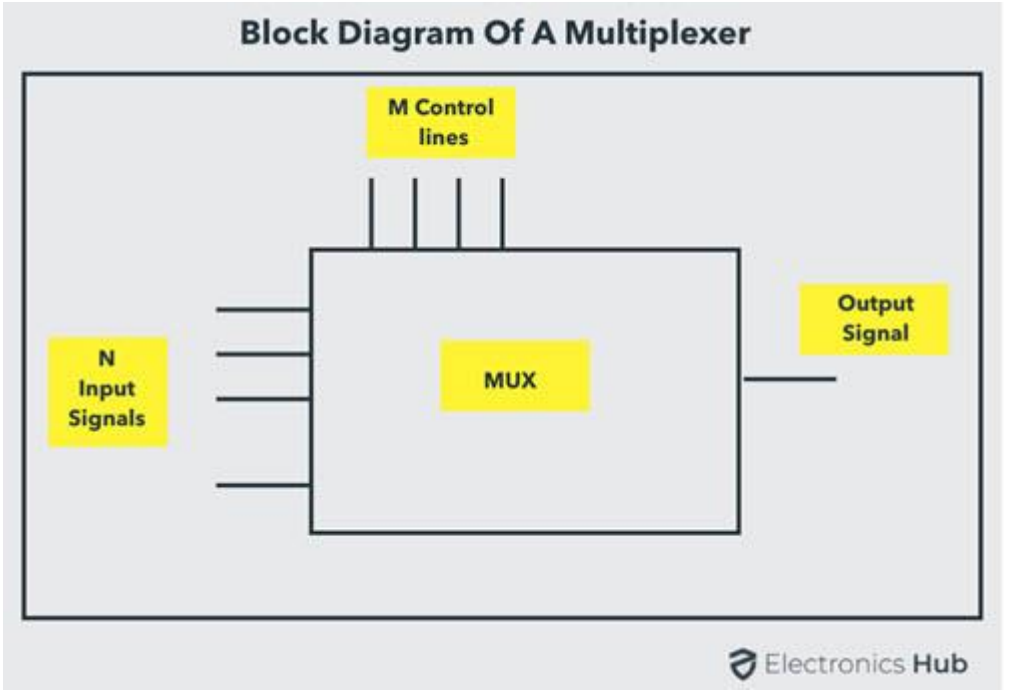
Multiplexer

- A Multiplexer is a circuit that accept many inputs but gives only one output.
- Multiplexer means many into one.
- A multiplexer is a circuit used to select and route any one of the several input signals to a single output.
- A simple example of an non-electronic circuit of a multiplexer is a single pole multi-position switch.
- Multi-position switches are widely used in many electronics circuits.
- Multiplexers can handle two type of data i.e., analog and digital.

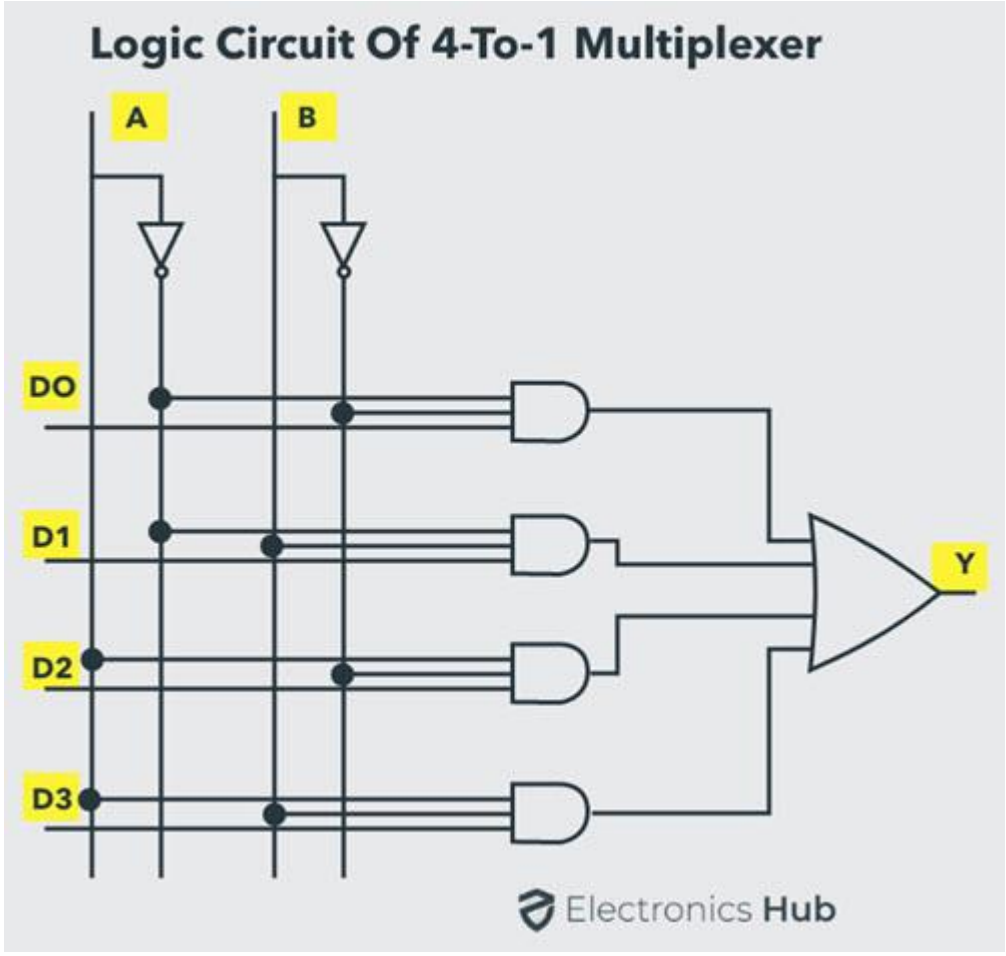
Multiplexer

The multiplexer used for digital applications, also called digital multiplexer, is a circuit with many input but only one output. By applying control signals (also known as Select Signals), we can steer any input to the output. Some of the common types of multiplexer are 2-to-1, 4-to-1, 8-to-1, 16-to-1 multiplexer.



Multiplexer

- Understanding 4-to-1 Multiplexer
- The 4-to-1 multiplexer has 4 input bits, 2 control or select bits, and 1 output bit.
- The four input bits are D0,D1,D2 and D3.
- Only one of this is transmitted to the output Y.
- The output depends on the values of A and B, which are the control inputs.
- The control input determines which of



Applications of Multiplexer

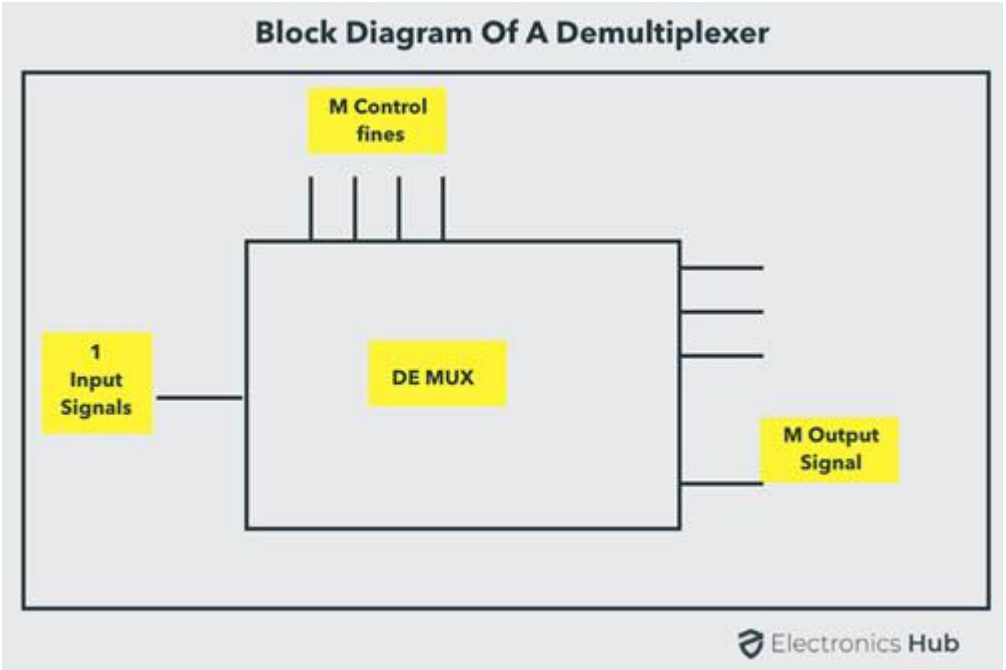
1. **Communication System** – Communication system is a set of system that enable communication like transmission system, relay and tributary station, and communication network.
2. **Telephone Network** – In telephone network, multiple audio signals are integrated on a single line for transmission with the help of multiplexers. In this way, multiple audio signals can be isolated and eventually, the desire audio signals reach the intended recipients.
3. **Computer Memory** – Multiplexers are used to implement huge amount of memory into the computer, at the same time reduces the number of copper lines required to connect the memory to other parts of the computer circuit.
4. **Transmission from the Computer System of a Satellite** – Multiplexer can be used for the transmission of data signals from the computer system of a satellite or spacecraft to the ground system using the GPS (Global Positioning System) satellites.

Demultiplexer

- A Demultiplexer functions exactly in the reverse way of a multiplexer i.e., a demultiplexer accepts only one input and gives many outputs.
- Generally, multiplexer and demultiplexer are used together in many communication systems.
- Demultiplexer means one to many.
- A demultiplexer is a circuit with one input and many outputs.
- By applying control signal, we can steer any input to the output.
- Few types of demultiplexer are 1-to 2, 1-to-4, 1-to-8 and 1-to 16 demultiplexer.

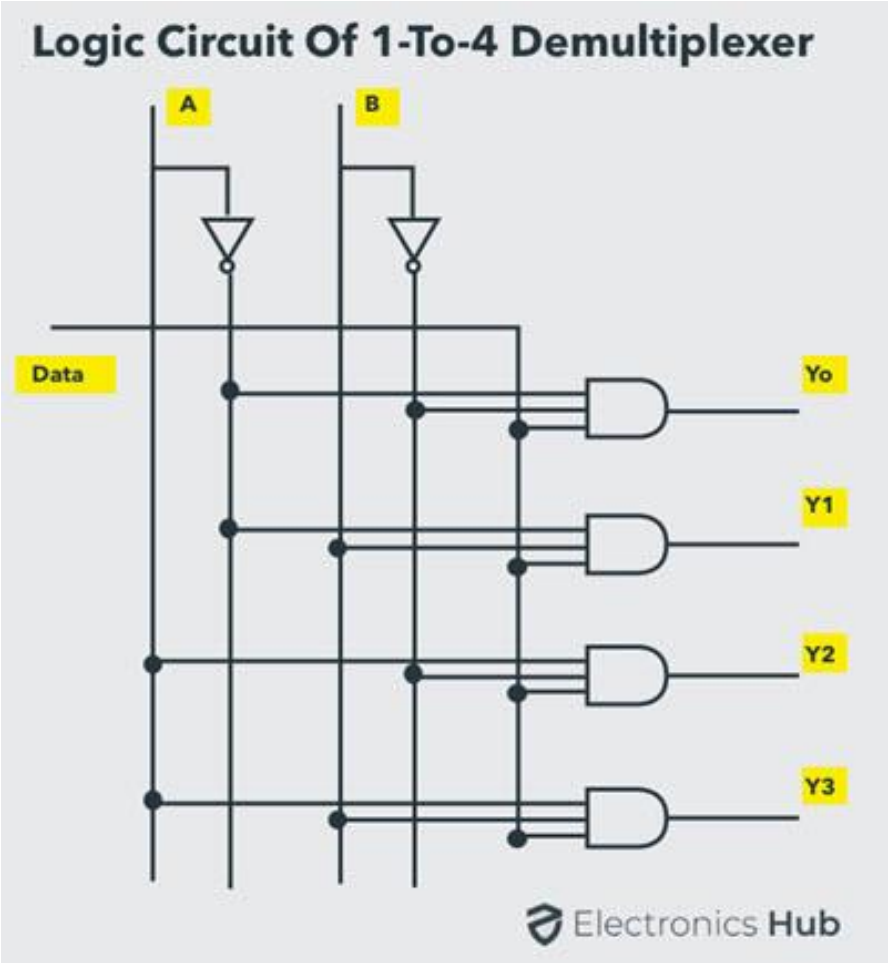
Demultiplexer

- Following figure illustrate the general idea of a demultiplexer with 1 input signal, m control signals, and n output signals.



Understanding 1-to-4 Demultiplexer

- The 1-to-4 demultiplexer has 1 input bit, 2 control or select bits, and 4 output bits. An example of 1-to-4 demultiplexer is IC 74155. The 1-to-4 demultiplexer is shown in figure below



Applications of Demultiplexer

- Demultiplexer is used to connect a single source to multiple destinations.
- **Communication System** – Communication system use multiplexer to carry multiple data like audio, video and other form of data using a single line for transmission.
- **ALU (Arithmetic Logic Unit)** – In an ALU circuit, the output of ALU can be stored in multiple registers or storage units with the help of demultiplexer.
- **Serial to Parallel Converter** – A serial to parallel converter is used for reconstructing parallel data from incoming serial data stream.