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Multiplexers and their application in everyday life

Our time is considered an era of technological discoveries, so the science of the world does not stand still but moves forward, opening up new opportunities for humanity. Every year the devices become more and more complex in their design and special devices called multiplexers and demultiplexers are used to facilitate their already large functions.

Multiplexers are devices that allow you to connect multiple inputs to one output. Modular multiplexers are very popular. These are modern designs of devices that have a certain number of replaceable modules. With the help of such replaceable modules, it is possible to change the configuration of the multiplexer, in accordance with the user's requirements and conditions of use.

Such a switch will work equally well with both analog and digital signals. However, the speed of mechanical keys leaves much to be desired, and keys often have to be controlled automatically using some scheme. In digital circuits, it is required to manage keys using logical levels. That is, you need to choose a device that could perform the functions of an electronic key with electronic control of a digital signal. The structure of the multiplexer can be considered by the example of its general scheme. The input data of the logical type is received at the outputs of the switchboard, and then sent through it to the output. The words of the address channels are fed to the control input. The device itself may also have a special control input, which makes it possible to pass or not pass the input channel to the output. There are types of multiplexers that have a three-state output. All the nuances of the multiplexer depend on its model.

In general, the principle of operation of the multiplexer can be explained by the example of a switch that connects the inputs to the output of the device. The operation of the switch is provided on the basis of a control circuit in which there are address and permission inputs. The signals from the address inputs indicate which information channel is connected to the output.

Resolving inputs are used to increase the possibilities – increasing the bit depth, synchronization with the operation of other mechanisms, etc. To create a multiplexer control circuit, an address decoder is usually used. Consider the process of multiplexing several channels with different wavelengths. Optical signals arrive at the focusing plate, on which they are focused and interfered. A multiplex signal is generated at the output, propagating simultaneously along all tracks of the waveguide array. The waveguide lens focuses this signal into an optical fiber for subsequent transmission over a fiber-optic communication line. Light radiation at all wavelengths travels the same path through an array of waveguides. Therefore, the introduced attenuation for multiplexers at any wavelength is the same and amounts to 5-7 dB.

Multiplexers that support audio and video signal transmission are used on television, on monitors and in surveillance cameras. This is their main area of application, but do not forget about their other capabilities. Based on these devices, GSM modules and various Internet modems are located, transmitting a signal on a high-speed connection, providing the owner with a high-quality, stable network.

In addition, these devices are used in GPS receivers, fiber-optic broadband networks. In total, these capabilities give the multiplexer a huge scope of application, from federal television to conventional home broadband Internet. In conventional digital traffic transmission systems over optical fiber, it is possible to transmit only one data channel over a pair of optical fibers. The installation of multiplexers allows you to organize the transmission of up to 96 channels over the same two fibers. A huge increase in productivity contributes to the popularity of this equipment among telecom operators, Internet service providers, owners of multiservice networks.

The use of multiplexing systems eliminates the need for a constant increase in the capacity of fiber-optic cables and the cost of their purchase and laying. The advantages of the solution are especially pronounced on extended fiber optic lines laid in inaccessible terrain. With an increase in the volume of transmitted traffic, it is enough to install multiplexers to increase the throughput tenfold.

Multiplexers are devices that allow you to connect multiple inputs to one output. Demultiplexers are devices that allow you to connect one input to several outputs. In the simplest case, such switching can be carried out using keys: Such a switch will work equally well with both analog and digital signals. However, the speed of mechanical keys leaves much to be desired, and keys often have to be controlled automatically using some digital circuits, it is required to manage keys using logical levels.