Electronic Signal

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Learning Objectives

- Define electronic signal and electronics.
- Compare and contrast analog and digital signals.

Did you ever make a secret code by assigning each letter of the alphabet a unique symbol? The code shown above is believed to have been used by George Washington to send secret messages during the American Revolutionary War. A different type of code can be sent with electric current.

Q: How do you think electric current can be used to encode messages?
A: The short answer is by changing the voltage in an electric circuit. Keep reading to learn more.

Electronic Messages

Electric devices, such as lights and household appliances, change electric current to other forms of energy. For example, an electric stove changes electric current to thermal energy. Other common devices, such as mobile phones and computers, use electric current for another purpose: to encode information. A message encoded this way is called an electronic signal, and the use of electric current for this purpose is called electronics.

To encode a message with electric current, the voltage is changed rapidly, over and over again. Voltage is a difference in electric potential energy that is needed in order for electric current to flow. There are two different ways voltage can be changed, resulting in two different types of electronic signals, called analog signals and digital signals.

Analog Signals

Analog signals consist of continuously changing voltage in an electric circuit. The Figure 1.1 represents analog signals. These were the first electronic signals to be invented. They were used in early computers and other early electronic devices. Analog signals are subject to distortion and noise, so they aren’t used as often anymore. They are used mainly in microphones and some mobile phones to encode sounds as electronic signals.

Digital Signals

Today, most electronic signals are digital signals. Digital signals consist of rapid pulses of voltage that repeatedly switch the current off and on. The Figure 1.2 represents digital signals. This type of signal encodes information as a string of 0’s (current off) and 1’s (current on). This is called a binary (“two-digit”) code. The majority of modern
electronic devices, including computers and many mobile phones, encode data as digital signals. Compared with analog signals, digital signals are easier to transmit and more accurate.

Watch this video to learn more about analogue and digital signals:
Summary

- A message encoded by changing the voltage of an electric current is called an electronic signal. The use of electric current for this purpose is known as electronics.
- Electronic signals may be analog or digital signals. Analog signals consist of continuously changing voltage in an electric circuit. Digital signals, which are the main type of signals used today, consist of rapid pulses of voltage that repeatedly switch the current off and on.

Review

1. What is an electronic signal?
2. Define electronics.
3. Create a table comparing and contrasting analog and digital signals.

References

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