

Radio

Radio is the technology of using radio waves to carry information, such as sound and images, by systematically modulating properties of electromagnetic energy waves transmitted through space, such as their amplitude, frequency, phase, or pulse width. When radio waves strike an electrical conductor, the oscillating fields induce an alternating current in the conductor. The information in the waves can be extracted and transformed back into its original form.

Radio systems need a transmitter to modulate (change) some property of the energy produced to impress a signal on it, for example using amplitude modulation or angle modulation (which can be frequency modulation or phase modulation). Radio systems also need an antenna to convert electric currents into radio waves, and radio waves into an electric current. An antenna can be used for both transmitting and receiving. The electrical resonance of tuned circuits in radios allow individual frequencies to be selected. The electromagnetic wave is intercepted by a tuned receiving antenna. A radio receiver receives its input from an antenna and converts it into a form that is usable for the consumer, such as sound, pictures, digital data, measurement values, navigational positions, etc.^[1] Radio frequencies occupy the range from a 30 Hz to 300 GHz, although commercially important uses of radio use only a small part of this spectrum.^[2]

A radio communication system requires a transmitter and a receiver, each having an antenna and appropriate terminal equipment such as a microphone at the transmitter and a loudspeaker at the receiver in the case of a voice-communication system.^[3]

Uses of radio ^[edit]

For a broader coverage of this topic, see [Radio spectrum § Applications](#).

Early uses were maritime, for sending telegraphic messages using Morse code between ships and land. The earliest users included the Japanese Navy scouting the Russian fleet during the Battle of Tsushima in 1905. One of the most memorable uses of marine telegraphy was during the sinking of the RMS *Titanic* in 1912, including communications between operators on the sinking ship and nearby vessels, and communications to shore stations listing the survivors.

Radio was used to pass on orders and communications between armies and navies on both sides in World War I; Germany used radio communications for diplomatic messages once it discovered that its submarine cables had been tapped by the British. The United States passed on President Woodrow Wilson's Fourteen Points to Germany via radio during the war. Broadcasting began from San Jose, California in 1909,^[24] and became feasible in the 1920s, with the widespread introduction of

radio receivers, particularly in Europe and the United States. Besides broadcasting, point-to-point broadcasting, including telephone messages and relays of radio programs, became widespread in the 1920s and 1930s. Another important application of radio, in the years just before and during World War II, was its development and active use for detecting and locating aircraft and ships by the use of radar (*RA*dio *D*etection *A*nd *R*anging).

Today, radio takes many forms, including wireless networks and mobile communications of all types, as well as radio broadcasting. Before the advent of television, commercial radio broadcasts included not only news and music, but dramas, comedies, variety shows, and many other forms of entertainment (the era from the late 1920s to the mid-1950s is commonly called radio's "Golden Age"). Radio was unique among methods of dramatic presentation in that it used only sound. For more, see [radio programming](#).

What are the different types of radios?

Each of the following types of radios come in VHF, UHF, and Digital varieties.

- **Handheld or Portable radios** are the two-way radios that most people use. As the name suggests you hold them in your hand and can be carried them with you.
- **Mobile radios** are used in vehicles and are permanently mounted. They can have up to 100 watts of power, need special licensing and setup, and you can expect more range with these types of radios.
- **Base stations** are placed on a desk or counter. They plug into a standard electrical wall socket, and use an antenna usually located on the highest point of the building where they are located. They also can have up to 100 watts of power, need special licensing and setup, and you can expect more range with these types of radios.
- **Repeaters** can extend the range of a radio by boosting the signal where the repeater is located so the signal may continue traveling. It can help you get "around" obstacles, or simply extend the range of communication beyond what is possible with your handheld or mobile radio alone.
- **Trunking systems** manage communications of more complex systems. In conventional radios a frequency is assigned to a channel through programming, one frequency per channel. Channel assignments in a conventional radio can only be changed by re-programming the channel. In a Trunked radio system all frequencies are in a "pool", the pool is managed by another device. Frequencies are allocated to a radio's channel dynamically as they are needed. Once the transmission is complete the frequency is released back into the "pool". This is a much more efficient use of frequencies but requires more sophisticated equipment. Generally systems with a large number of users require trunking systems. There are several types of trunking protocols; [CTCSS](#), [DTR](#), [PassPort](#), [SmartTrunk](#).
- **Radio Over Internet Protocol (ROIP)** can enable you to connect your radio system to the internet, thus allowing you to communicate anywhere in the world.

Characteristics of radio

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