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AM/FM radio can feel like pure magic. Switch on the radio and listen to music, talk shows, or any other audio entertainment being broadcast from a source located hundreds, if not thousands, of miles away. But radio isn't magic. It's a straightforward process. Here's a look at how radio waves are created and broadcast. [alengo / Getty Images](#) AM stands for Amplitude Modulation, and FM stands for Frequency Modulation. Both AM and FM radio programs are transmitted over the air via radio waves, which are part of a range of electromagnetic waves that include gamma rays, x-rays, ultraviolet rays, visible light, infrared, and microwave. Electromagnetic waves are all around, everywhere, at different frequencies. Radio waves have properties similar to light waves (such as reflection, polarization, diffraction, and refraction), but radio waves exist at a frequency that your eyes aren't sensitive to. Electromagnetic waves are generated by alternating current (AC), the electrical power used to run most of the technology in your home and life, from washing machines to televisions to mobile devices. In the United States, alternating current operates at 120 volts at 60 Hz. This means that the current alternates (changes direction) in the wire 60 times per second. Other countries use 50 Hz as the standard. Although both 50 and 60 Hz are considered relatively low frequencies, the alternating currents generate a basic level of electromagnetic radiation (EMR). This means some of the electric energy escapes the wire and is transmitted into the air. The higher the electricity's frequency, the more energy that manages to escape the wire out into open space. This is why electromagnetic radiation is sometimes loosely described as "electricity in the air." Electricity in the air is random noise. To be turned into useful signals that transmit information (music or voice), electricity must first be modulated. Therefore, modulation is the basis for AM and FM radio signals. Another word for modulation is change. Electromagnetic radiation must be modulated or changed to be useful as a radio transmission. Without modulation, a radio signal can't carry information. When it comes to radio broadcasts, the electromagnetic radiation (electricity in the air) must be modulated with the information to be sent. To better understand the concept of modulation, think about vision. A blank piece of paper is useless until it becomes modulated or changed in some meaningful way. You must write or draw on the paper to communicate useful information. AM radio uses amplitude modulation, the simplest radio broadcast form. To understand amplitude modulation, think about a steady signal (or wave) broadcasting at 1,000 kHz on the AM band. The constant signal's amplitude (or height) is unchanged, or unmodulated, so it doesn't carry any useful information. This steady signal produces only noise until it's modulated with information, such as voice or music. This modulation results in a change to the steady signal's amplitude strength, which increases and decreases in direct proportion to the information. Only the amplitude changes. The frequency remains constant. AM radio in the Americas operates in a range of frequencies from 520 kHz to 1,710 kHz. Other countries and regions have different frequency ranges. The specific frequency is known as the carrier frequency, which is the vehicle by which the actual signal is carried from a broadcast antenna to a receiving tuner. AM radio transmits over greater distances. It has more stations in a given frequency range and can be picked up easily by receivers. But AM signals are more susceptible to noise and static interference, such as during a thunderstorm. The electricity generated by lightning produces noise spikes that AM tuners pick up. AM radio also has a limited audio range, from 200 Hz to 5 kHz, making it better for talk radio than music. For music, AM signals are of lower sound quality than FM. FM radio uses frequency modulation. To understand frequency modulation, consider a signal with a steady frequency and amplitude. The signal's frequency is unchanged or unmodulated, so there's no useful information contained. When you introduce information to this signal, there's a change to the frequency directly proportional to the information. When the frequency is modulated between low and high, the carrier frequency is transmitting music or voice. Only the frequency changes as a result. The amplitude remains constant the entire time. FM radio operates in the 87.5 MHz to 108.0 MHz range, a higher frequency range than AM radio. The distance range for FM transmissions is more limited than AM, usually less than 100 miles. However, FM radio is better suited for music. The higher bandwidth range of 30 Hz to 15 kHz produces the sound quality we enjoy and prefer. To have a greater coverage area, FM transmissions need additional stations to carry signals further. FM broadcasts are commonly done in stereo (a few AM stations can also broadcast stereo signals). Although FM signals are less susceptible to noise and interference, physical barriers, such as buildings and hills, can limit them and impact overall reception. This is why you can pick up certain radio stations more easily in some places than others, or why you lose stations as you drive through different areas. Thanks for letting us know! Get the Latest Tech News Delivered Every Day [Subscribe](#) Tell us why! All of the hoopla over digital radio aside, whether it's satellite or HD, let's get one thing straight: FM radio isn't going anywhere. HD Radio was selected by the FCC to supplement AM and FM with a CD-quality digital stream, but as far as anybody knows, your favorite tuner will work until its transistors fall out. As a matter of fact, when browsing around the Ziff Davis Web site, it's easy to conclude that FM radio is everywhere, from iPod adapters to MP3 players, cell phones and even Pocket PCs. Here's a peek at some of the latest.It's kind of amazing how many cell phones have FM radios built in. A quick turn around PC Magazine's Web site finds stories on Nokia's 7710 smart phone and keypad-less 7280 Fashion Phone. Want more info on phones with FM built in? Check out the stories on the Siemens SX1 and the Sony Ericsson K700i.Apple's super-popular iPod doesn't offer FM radio built in, but many MP3 players do. Creative's Zen Micro, MuVo Slim and Iriver's H140 all have FM tuners to complement their MP3 playback.FM is also the most popular and cable-free way to bring satellite radio, or your MP3 collection, into your car's stereo. (Or your rental car's stereo!) Along with its other nifty features, Delphi's XM Roady2 has a built-in FM modulator that lets you tune in your satellite radio.On the iPod front, Belkin TuneBase FM and Sonnet PodFreq both combine an FM transmitter and an iPod charger for use in the car. Kensington offers a similar gadget for your iPod, the iPod FM Audio Transmitter/Auto Charger.Did we mention there's FM radio for a Pocket PC personal digital assistant? That's exactly what the Pocket PC FM Radio delivers: an FM radio built into a CompactFlash Card. Drop it into an open slot, and it turns your Pocket PC into an FM receiver.While we didn't list anything in the way of AM gadgetry, there's no cause to worry: It's here for the long haul, too. Given its lower audio quality and complications with high-tech circuitry (we've never seen an AM tuner for a PC, for example), it's just not the focus of this sort of gadgetry. Which is fine by us: There are few more simple pleasures than tuning in a far-away station on an ancient AM radio. By Melly Parker i Spencer Platt/Getty Images [News/Getty Images](#) Smartphones drain battery power more quickly than older feature phones not only because of their brighter screens, but also because of power-hungry apps. When using an Android smartphone, it's essential to monitor your battery use so you don't end up with a dead phone at the worst possible time. Limiting your use of apps that drain the battery – especially when the indicator flashes low – will help ensure you can use your phone when you need it. Listening to the FM radio on your phone uses battery power, but there are ways to mitigate the drain. Android is a mobile device operating system created by Google. Many mobile carriers and device manufacturers use Android; the variety is one of the reasons that Android has more than 50 percent of the United States' market share for smartphones, followed by Apple. Some Android phones, depending on the manufacturer, come with a native FM app and a radio wire in the phone that allows it to connect to FM radio networks without using data. There are two kinds of FM radio apps: those that access radio broadcasts online and those that access them over the FM frequency with a radio wire. If you're accessing an app online, it uses data. If not, it doesn't. The reason some FM radio apps require headphones is because the cord acts as the antenna for the radio signal, which doesn't require a data connection. Anything you do on an Android mobile – including simply checking the tone - will use the battery. The system processes required to keep the phone operating use battery life, though the largest drain on the battery is the power required to run the display. When you access the FM radio app - or any app - it takes a small amount of additional power on the part of the battery. If you want to save battery life on your Android, run the FM radio app with the screen off. The longer you leave the screen on while the app is running, the more battery power you're draining. By going into your settings, you can check the amount of battery power you have left; the operating system also gives you a detailed rundown of which apps are using up the battery power. Apps that automatically update over Wi-Fi and data connections or those that stream audio and video take up more power than apps with none of those functions.

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