

Satellite Radio - It's Not Your Father's Sputnik

Ever wonder how this whole satellite radio thing works? I mean, it seems to be THE thing now. Many auto manufacturers are installing satellite radio receivers in their new automobiles, and there are home and portable models available through your favorite electronics outlet. But what is it? How does it work? Why should I pay for radio?

You pay for TV, don't you?

Once, in those long gone days of yore, cable television operators offered us television, which we had happily been receiving for free through big tree-branchy things on our roofs, for a fee. Many people scoffed at the idea of paying for 30 channels when they received four or five, gratis. Well, just look at us now - cable TV, satellite TV, 500 channels not quite filling us up. So let's stop asking questions about why you should pay for satellite radio, and let's find out how the dern thing works.

Well, how does the dern thing work?

Let's start by looking at the type of radio you are used to. AM radio broadcasts at a frequency range from 535 kilohertz (kHz) to 1700 kilohertz (1.7 MHz). FM broadcasts between 88 MHz to 108 MHz. Without getting too technical, one hertz is basically one cycle per second. So FM radio waves transmitted at 88MHz are cycling 88 million times per second. This seems like a lot, but is actually relatively slow. Slower cycles require larger antennas to transmit and to receive them. Also, radio station antennas are stationary and earthbound, and are therefore limited in range. At higher cycles, smaller antennas suffice. Cell phones range from 824 MHz to 1990 MHz (1.99GHz), depending on the type of service; this is a much faster cycle, and therefore a smaller antenna is used. Satellite radio is broadcast at 2.3 GHz, so your car or portable receiver has no trouble picking up the signal. There have also been great advances in antenna technology, which provide us with a relatively small, flat antenna rather than a dish that would have to be constantly adjusted to point toward the satellite as we drove around town picking up kids from soccer practice.

All them numbers hertz my brain.

Let's lay megahertz and gigahertz aside for a moment. In addition to those higher frequencies, satellite radio signals come from, you guessed it, satellites. These satellites are in a geosynchronous orbit, which is an orbit that keeps the satellite always above one location on the planet, making it stationary relative to the earth. The satellite receives a digital signal from the ground station and bounces it back to us. Because the signal is digital, it can be compressed and beamed out packed full of additional data (disguised as 0's and 1's), and received by any satellite radio receiver tuned to the signal. Satellite radio receivers can pick up the broadcast from anywhere in the coverage area (meaning the whole US) because the satellite is orbiting at about 22,200 miles (35,000 km) above the earth, which allows for a greater dispersion of the signal. It's analogous to water flowing from a showerhead. An inch from the showerhead, the water is a relatively tight stream. At the other end of the shower, the water sprays all over the wall, and gets on the bathroom floor, causing your wife to yell angrily about the mess. Satellite radio beams work in much the same way. The radio signal is much more widely dispersed 22,000 miles from the satellite that sent the signal. So with satellite radio, you can listen to the same station as you drive from New York City to Los Angeles, whereas traditional radio has a range of only about 30 to 40 miles. And thanks to repeaters, or signal boosters, placed in urban areas, you can receive generally uninterrupted signals even driving through cities with large buildings and thick bridges.

Hey, that's kind of cool!

But wait! There's much, much more! The digital signal can carry much larger packets of data, and satellite radios are equipped with chipsets, or processors, that can decode that data. So satellite radios not only play the music, but also decode and display information containing the song title, album, artist, and genre. Satellite radio owners can also choose from hundreds of stations, which allows for specialization, just like your cable or satellite TV. In the same manner that you can get the HBO Comedy Hits of the Brahman Caste of Nepal Channel, and Tasmanian Worm Wrestling on ESPN 127, you can receive niche music, comedy, news, and sports broadcasts on your satellite radio. Pick your genre: any decade since the 40's, Rock, Country, Urban, Jazz, Blues, Dance, Latin, World Music (e.g. Chinese, Indian, African), Classical, Kids, and even news, sports, comedy, and talk. You can also tune in to any sub-genre of the above; for example, in the Rock category you can listen to soft, heavy, classic, deep cuts, acoustic, instrumental, and even unsigned acts.

Maybe I should get me one of them there satellite radios...

Now that you know how it works, you can listen for the sheer pleasure of it - without all those nagging technical questions churning in the back of your mind. Go get you one.

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About the Author

Albert Medinas has developed and maintains the website Satellite Radio Galaxy, which answers the most common questions people have about Satellite Radio. Please visit us at <http://www.satelliteradiogalaxy.com> today.