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The Latest and The Best Digital HD Radio For the Home

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FIRST OUT OF THE GATE?

Audio Design Associates has often been the first audio company to ship products featuring a new technology, and it may be again with the Tune Suite HD. The multiroom-oriented Tune Suite is a modular unit that accommodates as many as four radio tuners in a single chassis. The tuners can be any combination of AM/FM, XM satellite radio, and HD Radio.

Digital HD Radio For the Home

Every day, millions of Americans watch HDTV pictures that look clearer than your grandfather could have imagined. We carry thousands of songs on devices smaller than the pack of Pall Malls grandpa used to smoke. Instead of sitting around hoping a good movie will appear on TV, we can get practically any film we want at a Blockbuster store five minutes away. But when it comes to radio, we're no further along than our grandparents were. We still listen to
analog AM and FM, just as they did five long decades ago.

At long last, though, radio is moving toward modernity. HD Radio, a new digital broadcasting technology, is already a part of hundreds of radio broadcasts across the United States. It comprises a stream of digital audio and data that "piggybacks" onto existing AM and FM broadcasts. Listen to your favorite station on a conventional radio, and you will never know the HD Radio signal is there. But with an HD Radio receiver, the same station delivers crystal-clear digital sound, along with new services that make plain old AM/FM radio seem as antiquated as black-and-white TV (which, technically, it is).

HD Radio has already found its way into several car audio products; the first was introduced in January 2004. Of course, most people do most of their radio listening in the car, so getting HD Radio into that environment was a priority for radio makers and broadcasters. But those of us who focus more on home entertainment (including, obviously, the readers of Home Entertainment) have been left out in the cold—or to be more precise, out in the static and hiss of ordinary AM and FM.

Fortunately for us, the first home HD Radio products are starting to ship. They include everything from clock radios to audio/video receivers to high-end stand-alone tuners designed for use in complex multiroom audio systems. We were lucky enough to get our hands on one of the very first home HD Radio units: the Tune Suite HD modular radio tuner from Audio Design Associates. We have much to say about our experience with this breakthrough product—but first, let's discuss HD Radio itself in a little more depth.

HD Radio Revealed

The sole developer and licenser of HD Radio is a company named iBiquity Digital. iBiquity's rather brilliant scheme requires a relatively modest $100,000 investment on the broadcasters' part, because it works with existing radio transmission equipment. As a result, radio stations are happily jumping on the digital radio bandwagon, while many TV stations are still dragging their feet on digital TV years after that technology was introduced.

The top 21 radio companies in the United States, including such familiar names as ABC, Clear Channel, Infinity Broadcasting, and Radio One, have committed to converting a total of more than 2,500 stations to HD Radio. National Public Radio promises it will convert all of its 309 affiliate stations to HD Radio, and interest from smaller independent stations seems to be picking up.

What can we expect from HD Radio? According to iBiquity—and to our brief experience with ADA's Tune Suite HD—HD Radio provides much better sound and reception than AM and FM. iBiquity sums up HD Radio's performance as "AM digital will have FM-like audio quality, and FM digital will have CD-like audio quality." You hear no static or interference from other stations, and the signal does not fade as it does with analog AM and FM—it simply stops when you move out of range. Usually, the HD Radio feed simply carries the same program as the analog signal, but as we will see, this simulcast arrangement may not be the norm for long.

Because the quantity of digital audio data HD Radio can squeeze in alongside analog AM and FM broadcasts is limited, iBiquity uses digital compression to reduce the amount of data required. The company's HDC compression technology works much like the MP3 compression college students use to swap music files. HD Radio's standard data rate is 96 kilobits per second. That's lower than the 128 kbps data rate most people use to encode MP3 files, but HDC is a much more modern and capable compression technology than MP3, which was invented in the Reagan era. Thus, a 96 kbps HD Radio transmission should sound at least as good as, if not better than, a 128 kbps MP3 file.

Surround sound may also be a standard offering on HD Radio. At the Consumer Electronics Show in January, iBiquity announced a partnership with SRS Labs to offer SRS Circle Surround encoding on HD Radio broadcasts. Circle Surround is similar to the Dolby Surround encoding/Dolby Pro Logic decoding process that was prevalent in the 1980s and 1990s, before the advent of 5.1-channel discrete digital systems such as Dolby Digital and DTS. To broadcast in Circle Surround, a station routes up to 6.1 channels of sound into a Circle Surround encoder, from which two channels of sound emerge and are then broadcast through HD Radio. These broadcasts are compatible with ordinary stereo equipment, but when you play them through an audio/video receiver with surround speakers, or a car audio system equipped with Circle Surround II decoding, you hear surround sound.

More Than Better Sound

The FM version of HD Radio offers advantages ranging beyond better sound. If the Federal Communications Commission approves it (and it probably will), FM stations will be able to add Supplemental Program Service (SPS) that allows up to seven additional programs to broadcast over a single station, much as digital TV stations can now broadcast multiple programs on a single frequency.

Imagine your favorite classic rock station dividing its broadcasts into different eras of music. Instead of simply tuning in to, say, 98.7 FM, you might choose from '60s music on 98.7a, '70s music on 98.7b, and '80s music on 98.7c. Your NPR affiliate could offer news and talk programs on 89.3a, jazz on 89.3b, and classical on 89.3c. This "multicasting" capability may be the real reason FM broadcasters are eager to upgrade their stations to HD Radio technology. A radio band that is now crowded with 30 local stations could conceivably match the breadth of programming found on the XM and Sirius satellite radio services, each of which offers more than 100 channels of programming.

Pending approval of SPS, multicasting HD Radio stations will transmit a Main Program Service (MPS) with SPS tacked on as they choose. As you might expect, adding SPS will cut into the quality of the MPS broadcasts. A typical broadcasting scheme might include MPS at 64 kbps and an SPS program at 32 kbps.

In addition to audio, HD Radio can also carry other digital data. The simplest application for this data would offer the name of the song and artist currently being played, or the name of the news show you are listening to. It could also carry album art, which could be viewed on a radio with a color display. Stations could add something like the "news crawl" you see at the bottom of the screen when you watch Fox News or CNN. The crawl could include weather, news, sports, a stock ticker, or traffic information. A news station could transmit traffic data full-time during rush hour, so you don't have to wait several minutes to get traffic updates. The crawl could also display Amber Alerts, and a radio equipped with a display could even show a picture of the missing child.

From there, services could expand to automatic ticket purchasing through radio stations, automatic recording of radio programs for later playback, and even automatic navigation, using HD Radio traffic data in conjunction with a car's GPS system to guide you around traffic snarls and construction (although some current GPS units already offer similar services).

First Listen: Home HD Radio

Home HD Radio products are just now starting to trickle into stores. The HD Radio vanguard includes Boston Acoustics, which is making an HD Radio version of its excellent Receptor Radio; Yamaha, which will incorporate HD Radio into its audio/video receivers; and Sanyo, which plans a HD Radio-equipped clock radio. iBiquity expects 15 to 20 manufacturers to launch HD Radio products this year, but at press time the company could provide few details.

Another HD Radio pioneer is multiroom audio specialist Audio Design Associates (ADA), a small but innovative company that was also among the first to offer Dolby Digital and DTS surround-sound processors and home XM satellite radio receivers. ADA's Tune Suite radio tuner accommodates as many as four tuner modules, which can be any combination of AM, FM, WX (weather band), XM, and now HD Radio. All four modules can be active at once, so a single Tune Suite can feed four different radio signals simultaneously into a multiroom audio system. You can, for example, hear AM in the kitchen, XM in the living room, FM in the bedroom, and HD Radio on the patio.

ADA is kind enough to send me an Anvil case with a loaded Tune Suite and some additional equipment that allows me to control the Tune Suite and connect it to my Polk Audio home theater system. I set up the Tune Suite on my living room coffee table, connect ADA's preamp and wired tabletop remote control, and hook up a loop antenna for FM plus an XM antenna (the AM loop antenna is already connected). Next, I use ordinary RCA-type analog audio cables to interface the ADA gear with my Polk system.

I pick up the tabletop remote and tune to New York City's WOR 710 AM. At first, I hear only static, but when I lift the antenna off the floor and put it on my windowsill, the signal clears up. WOR sounds much

cleaner than normal, despite the fact that I already get a strong AM signal because my apartment window has a clear line of sight to the antenna atop the Empire State Building. I switch to WNEW 102.7 FM and it sounds even better—as good as satellite radio, in fact. I am also able to tune in three other FM HD Radio stations in New York City.

Although I cannot listen to the same program on XM that I do on HD Radio (XM does not carry local radio stations), the two systems seem equally clean and robust. The Tune Suite also lets me compare the same programs in regular FM and HD Radio FM. It's a close match, given the excellent FM reception I enjoy, but HD Radio FM has a slightly cleaner sound; regular FM sounds somewhat muddy in comparison.

Unfortunately, HD Radio is still rather expensive to implement, so it may be a while before it becomes a common feature in home electronics. According to Tom DeVesto, president of Tivoli Audio, a radio that retails for $150 would jump to $300 for an HD Radio-equipped version. (The fact that Boston Acoustics will offer its Receptor HD for $299 bears out DeVesto's statement.) The chipset required for HD Radio is expensive at present, especially compared with the dirt-cheap price of a conventional AM/FM tuner chip. Plus, the manufacturer must pay iBiquity's licensing fee. For these reasons, Tivoli has chosen not to add HD Radio capability for now. But of course, the price of the HD Radio chipset will drop over time, and the technology will become much more affordable.

Although it will take some time for HD Radio technology to find its way into many (if not most) radios, its future looks bright. It will take a few years to convert most AM and FM stations. But HD Radio tuners can also receive analog broadcasts, so your HD Radio receiver will be able to pick up all your favorite stations even if they haven't yet converted.

After my first taste of HD Radio, I am convinced that radio must convert to digital to remain relevant in this day and age when listeners have so many other options, including satellite radio and Internet radio. HD Radio's improved sound quality and impressive information-carrying capabilities make it a welcomed and dramatic improvement to a technology that has barely changed since 1961.