



## HDTV DVR Satellite Receiver

Charles Wood

DISH Network arrived on the direct-broadcast satellite scene several years after the launch of DirecTV®. Although DirecTV remains the larger of the two program suppliers in terms of subscriber base, DISH has not taken a backseat in terms of programming options, particularly in the area of HDTV.

While DirecTV has undergone ownership changes over the years, DISH/Echostar, a public company, has remained under the same management with Charlie Ergen at the helm. Ergen and his staff had a lot of experience in the home satellite industry long before DBS came on the scene. His early hardware distribution company, Echosphere, acquired Houston Tracker, a manufacturer of big dish C and KU band receivers and dish movers during the 80s. As a result, DISH has seemingly been able to anticipate and adapt to market conditions and opportunities more quickly than DirecTV, whose management style has tended toward that of corporate “suits.” Put simply, when Ergen has decided to make a strategic management move he has done it quickly and efficiently in a manner that one over-the-air broadcast network executive once described to me as “cowboy-like.” Regardless, DISH, under Ergen and staff, has made some shrewd business moves.

Ergen took advantage of an opportunity to acquire the defunct VOOM satellite transponders as well as the separate VOOM HD programming company. As a result, for the last several years, DISH has been able to deliver a much wider range of high-definition programming than DirecTV.

In a fashion that mirrors other specialist companies in the consumer electronics industry, DISH has required somewhat of a learning curve to refine their receivers/DVRs to their present level of performance and sophistication.

DISH Network has continued to produce, sell, and now lease its own receivers while DirecTV licensed a number of companies early on to produce receivers. The situation is somewhat analogous to that of Apple® and Microsoft®, with Apple retaining control of its product, while Microsoft licensed technology to a wide range of product/software suppliers.

Some owners have experienced software glitches in DISH's predecessor receiver designs, and while my prior units gave me no headaches, some DISH subscribers have complained loudly about various equipment issues on A/V forums. Recently, a new DISH ViP722 was installed at my home and with a couple of caveats, I believe few users will have reasons for any complaints.

I've found the 722's high-definition video performance to be near, if not state-of-the-art, and a quantum leap better than what I've observed from current DirecTV HD offerings. I should point out that the delivered video performance, for the most part, is not a function of the receiver as much as it is the quality of the signal being processed. DISH Network, at the time of this writing, is delivering superior HD video than DirecTV and the number of channels being delivered doesn't really count, it's the quality of the HD that counts.

### Setup

Assuming the appropriate dish antennas and LNBS (low-noise block amplifier) are in place, it's simply a matter of hooking up the coax with the proper couplers and switches to allow all signals to feed the 722 with a single coax line. That said, because DISH leases all receivers at this point, either a DISH factory installer or independent contractor will make the installation, oversee the automated diagnostics test, and assist in ordering programming.

All the setup is menu driven and generally intuitive, and I particularly appreciated the fact that DISH paid attention to over-the-air needs as well as their satellite-delivered programming. A signal strength meter display is provided for OTA channels and is quite useful for orienting a terrestrial antenna.

OTA programming is transparently integrated into the onscreen programming guide.

As you can imagine, overall functionality is immense and covers favorite channels, program categories, program ratings and lockouts, pay-per-view, DVR, interactivity, caller ID, and more. These are functions that, while sophisticated, are the norm today. I won't go into them in detail—they're there and they work. I was far more interested in the quality of the HD video delivered by the 722, how easily the DVR system is navigated by the average user (the non-technical significant other), and how reliable it is likely to be.

### 722 Overview

The 722 is a compact, menu-driven design. Only a few controls hide behind a panel to allow operation to continue, including menu and navigation keys, a USB port, and indicator/status LEDs in the event the remote control is lost or misplaced. Inside the box reside two satellite tuners, an over-the-air 8VSB tuner, a 500-gigabyte hard drive, and software and associated electronics for MPEG-2 and -4 decoding.

## DISH Network ViP 722 HDTV DVR Satellite Receiver

SPECIFICATIONS

If the 722 customer elects to use both satellite tuners at one location, it is possible to use picture-in-picture (PIP), record one show while watching another, or even record two shows while watching a third. A second option provides for feeding standard-definition audio and video to a second location—using the provided second RF wireless remote to control the second satellite tuner within the 722. The main remote for primary viewing/listening is infrared rather than RF wireless. If the second location is not in use, the 722 can be configured for multi-tuner/PIP operation at the main location by touching a single MODE button. At the time of installation, the DISH installation technician will run the coax feed to a second location, upon request.

The back panel includes analog and digital audio outputs, S-video, composite, and component video outputs, an HDMI digital output, over-the-air antenna and satellite antenna inputs, a telephone jack, a USB port, and in-home distribution output.

Simply put, the 722 will more than provide for the needs of 99+ (or 99-plus) percent of the DISH subscriber base in terms of functionality and performance. But *Widescreen Review* readers are the types of individuals who make up that fraction of one percent that might have complaints—real or imagined—about the 722 or any piece of high-tech consumer electronics.

One area of weakness that has been discussed on Internet satellite forums has been one of overheating if placed in a non-ventilated enclosed cabinet. Understandably, a small, compact enclosure with the requisite reception and decoding electronics, and a hard drive for storage, does build up heat. My 722 has experienced no operational or shut-down problems as a result of heat, but I do have it placed on an open shelf near my projection system. The air intake/outlet ducts are comprised of perforated holes on the bottom panel of the chassis with slots on both side panels. It is imperative that they not be blocked, or overheating will be the result. An independent DISH installer told me he has replaced a number of 722s as a result of overheating caused by inadequate ventilation in the customer environment.

## HDTV Performance

Both DirecTV and DISH have received complaints regarding the delivered quality of their HD video. In some cases, the complaints have been justified, and in others the problems originated with the program suppliers.

The two main complaints have dealt with starved bit rates and “downrezing” (reduced resolution) in a conscious effort to squeeze more channels into a given number of satellite transponders and a finite amount of spectrum space. One could argue that an unnecessary amount of space is devoted to shopping and infomercial channels on both services. In addition, the burden on available spectrum has been further squeezed by the FCC requirement that satellite service providers carry local digital channels.

Over the last two years or so, both services have made a move to transition to MPEG-4, a more efficient compression scheme than MPEG-2, allowing a lower data/bit rate. To further reduce bandwidth, some channels have been reduced from 1920 x 1080 to 1440 x 1080, which on paper, places the downrezed channels somewhere between 1920 x 1080 and 1200 x 720p.

The reality is that motion artifacts, at least to my eyes, are far more annoying than slight differences in resolution. As an example, my entry level Canon HV20 high-definition camcorder operating at 1440 x 1080 doesn't look quite as sharp as the best over-the-air live 1080i broadcast, nor does it have as wide a color gamut, and the picture is a bit grainier. That said, overall the HV20 looks better simply because the compression artifacts constantly observed on most program sources are virtually eliminated by the 25 megabits/second HDV operating system versus about 11 to 18 megabits for over-the-air or satellite ATSC HD. It is a sad state of affairs when an entry-level consumer product produces a picture that arguably looks better to the eye than hundreds of thou-

Triple Tuner: 2 satellite, 1 8VSB terrestrial  
MPEG-2 and -4 capable  
DVR w/500 gigabyte hard drive, can record two sources while playing back a third  
Single or dual zone capable with PIP function in single zone mode  
Interactive capable with DISH customer service and select satellite channels

### Inputs

Over the air terrestrial antenna (1) (F-type female)  
Satellite dish inputs (2) (F-type female)  
Remote RF antenna for second zone remote control  
Phone jack for PPV and caller ID  
USB port for multimedia devices or camera for DVR storage of customer slide shows (2—one located on rear panel; second on front panel)

### Outputs

In-home distribution port (F-type female)  
S-video and analog stereo outputs (RCA type female)  
YPbPr Component Output (analog RCA type female)  
HDMI output  
Ethernet port  
Digital audio optical

Dimensions (WHD In Inches): 16 x 3.5 x 13

Weight (In Pounds): 12

Cost: Varies, depends on program package selected; free under certain conditions to new DISH subscribers. Only provided under a lease arrangement.

### Manufactured In By:

Echostar Corporation/DISH Network  
94 Inverness Terrace East  
Englewood, Colorado  
Phone: 303.706.4000  
www.dishnetwork.com

sands, if not millions, of dollars in HD broadcast gear, as a result of over compression by the broadcaster, cable, or satellite company.

Giving credit where credit is due, I compared my local over-the-air digital sources against the very same signals delivered by DISH. The stations are located in Salt Lake City, about 300 miles north of my location in extreme southwest Utah. My local sources are low power digital repeaters relaying the originating digital signals from Salt Lake City. The ABC affiliate in Salt Lake City is not carried on satellite at this time. Conversely, KSL, the NBC affiliate, does not yet have a digital repeater on the air in my area because of FCC constraints on construction permits. For those reasons, I have only been able to compare FOX (720p) and CBS (1080i) OTA versus DISH delivery of the same signals. Even so, I was able to draw some conclusions that are likely to be valid elsewhere.

The FOX repeater in my area carries the HD channel as well as the SD version of the same signal on the sub-channel. When I compared the two sources, I could tell no difference other than the time delay as a result of decoding/re-encoding of the signal.

Sports events did have some occasional motion artifacts. To determine the source of the artifacts or at least get a fairly close idea, my methodology was to use the DVR capability of the ViP722 to simultaneously record the OTA signal along with the DISH-delivered signal and then freeze-frame and photograph identical sections of the two frames where artifacts were occurring. Because it is impossible to match precisely the exact frame from both satellite and over-the-air, I spent a great deal of time analyzing frames in a given segment.

In the case of the FOX 720p signal, I could see no observable difference in quality between the two sources. Evening entertainment programming was quite stable and because of their nature, seldom displayed any motion artifacts.

I performed the same experiment with CBS OTA and DISH-delivered CBS. At times, CBS programming looked slightly sharper over-the-air than by DISH. This was evident only on the most well-done sports programming, particularly football, where the game was being played on real turf. The blades of grass were more defined over-the-air, whereas the DISH signal seemed smooth...akin to an audiophile recording being played full range with the exception of the



CBS off air looks very slightly sharper when comparing stripes on flag but with more visible motion artifacts.



CBS off satellite looks ever so slightly softer than CBS off air local digital but has slightly fewer motion artifacts. The stripes of the flag on the helmet look softer than off air.

highest frequencies being filtered or rolled off. Conversely, at times, over-the-air exhibited slightly more motion artifacts than off satellite.

While full 1080i looked slightly better to the eye from the over-the-air signal from the highest quality live programs such as sports, there were occasions when it looked simply awful with either source. I would have to say the recent U.S. Open Tennis coverage on CBS was technically some of the worst HD I have ever seen, with extremely bad motion artifacts and excessive edge enhancement. It looked equally bad off satellite or over-the-air. And I've noticed a trend lately with live CBS sports programming, with an inordinate amount of visible motion artifacts.

KSL, the NBC station in my area, does not yet have a digital repeater, and I only get to view their HD signal off DISH. I can say with no comparison available that NBC's three best live shows in terms of HD technical quality (*The Today Show*, *The Tonight Show*, and *Conan O'Brien*) looked excellent as received from DISH. But they all exhibited motion artifacts in the form of smearing and graininess as opposed to overt tiling and mosaic artifacts.

I made my comparisons using a Sony 50-inch LCD rear-projection system, vintage 2005, and an entry-level VIZIO 42-inch LCD flat screen, current model. The Sony scales to 720p and the VIZIO to 1080p.

In the photographs you will note the comparison of observed over-the-air artifacts versus the same scenes off satellite. Note that because I was unable to match frame for frame, the scene-matching for photographic purposes was within a second or less. The photographed images were processed in Photoshop with some sharpening, which makes artifacts slightly more visible.

I also noted the VIZIO 42-inch 1080p display to be far more revealing of detail and artifacts than my older 50-inch Sony 720p display.

I have to summarize with respect to video performance of the 722 that DISH Network, in general, is having very little negative effect on

should track nationally, your results may vary depending on your local stations and how many sub-channels they are operating.

The "cleanest" non-broadcast channels on DISH remain, in my opinion, HDNet, HDNet Movies, some of the VOOOM channels, Discovery HD, and National Geographic Channel.

I did not have the means of comparing DISH with DirecTV on an A/B comparison. What I did, however, was visit two "box" electronics stores demonstrating and selling DirecTV. In both cases, HDNet was being used. One salesperson told me he used HDNet because it looked the best of the DirecTV HD channels. Watching the HDNet programming over DirecTV in the store revealed almost continuous motion artifacts with any significant movement within the image. Although motion artifacts can be seen on any of the DISH HD channels under some conditions, the amount and frequency was far less than what I observed on DirecTV. As an example, a music concert on HDNet shown on DISH was recorded live, with lots of movement and flashing lights, and it was free from artifacts that I would consider annoying.

However, if your home theatre incorporates a high-quality projection system with a display size much over 40 inches, you are likely to see consistent motion artifacts from any of the HD cable or OTA channels on DISH or DirecTV.

Unfortunately, the ATSC (Advanced Television Standards Committee) system has been crippled by design and the unwillingness of the FCC to mandate minimum-performance specifications that affect visible motion artifacts and observable resolution. Critical viewers will have to look to Blu-ray Disc and HD DVD with their higher data/bit stream rates to provide a level of HD performance that extends beyond OTA and cable/satellite channels. It's obvious that HD has been degraded to the point that most service providers

**"NBC's three best live shows, in terms of HD quality, looked excellent as received from DISH."**

perceived detail on the very best 1080i sources and no apparent differences on 720p sources, but those observations are based on the present level of compression of the MPEG-4 signals. However, I did notice motion artifacts at times on every HD channel, and I have no means of comparing the original feed to DISH of such premium services as HBO, Showtime, etc. Only the two networks mentioned, FOX and CBS, provided me any means of comparison. While my results

believe the public, watching on average-sized displays, is willing to accept the degradation without complaint.

### DVR Performance

The ViP 722 has a generous 500 GB hard drive that allows recording/storing of up to 55 hours of high-definition program materi-

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al. A one-time fee of \$40.00 enables a USB port to feed an external hard drive. I hooked up a run-of-the-mill 300 GB outboard drive and transferred several programs from the main 722 internal drive without incident. Playback from both drives was identical, visually. Presently, there are no constraints on performance, although a DISH spokesperson at the recent CEDIA (Custom Electronics & Design Installation Association) EXPO told me the ability exists to downrez the output to the external hard drive as well as the analog outputs, should programmers demand it. Serious film collectors may elect to view film HD transfers on Blu-ray Disc or HD DVD with far fewer, or no motion artifacts, and in their original aspect ratios. Some services such as HBO continue to crop to fill a 16:9 display. Nevertheless, the ability to archive programming and time-shift HD with the 722 remains a strong user feature.

## Audio

The audio standard for HD is Dolby® Digital. I did not attempt to sync up a DVD with a DVR recording of the same film. I watched films on HBO, Showtime, and HDNet, and I had no complaint with the audio sourced from the receiver with the HDMI connection. The analog output of the same signal was competent, if not bleeding-edge state-of-the-art, but broadcast and film audio is typically a different "beast" than the typical audiophile recording. Film and home theatre lovers should have no complaint with the 722 in terms of audio performance.

## Remote Control

The 722 remote is the same physical and general ergonomic design that DISH has used for a number of years. The benefit is perhaps a bit trivial, but as customers are upgraded with newer receivers, they don't have to relearn an entirely new remote. As previously noted, two remotes are supplied: an RF (radio frequency) wireless for the second room location and an infrared for the main location. Both are universal designs, and codes are provided to allow programming to accommodate customer-owned associated electronics gear.

## User's Guide

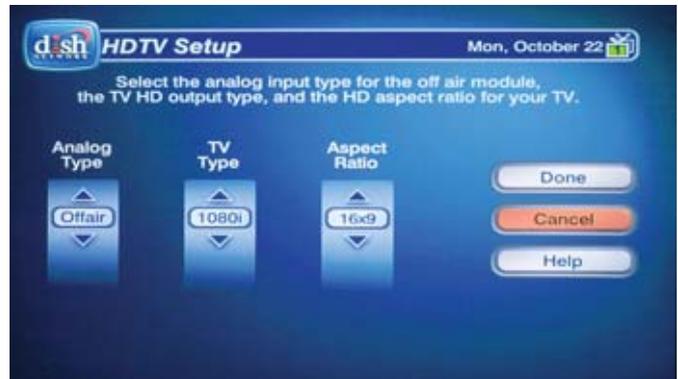
Instruction manuals are often overlooked, but questions invariably come up after the installer departs. The 722 User's Guide is logically laid out, although Connections and Setup are near the end of the manual. The assumption is that the 722 will be installed by a DISH or contracted technician. Diagrams and charts are easy to read and follow.

## Programming Packages

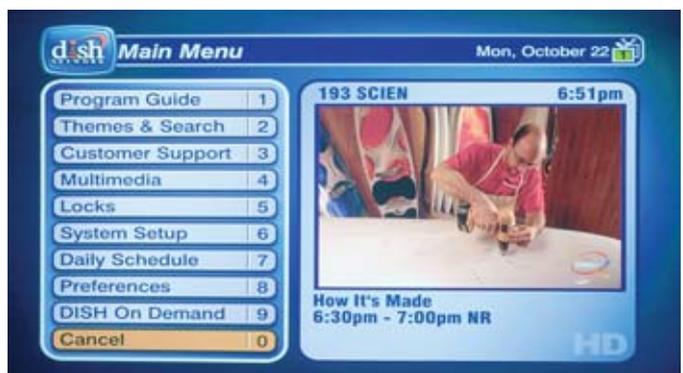
The "churn" rate among satellite, cable, and cellular services is high. Customer turnover is fueled by competitive promotions, and the one constant is that there is almost always some type of promotional package or price available. The current DISH offer for first-time residential customers at the time this was written included a DVR at no charge and the HD programming package free with the "Top 100" basics for six months at \$29.95 per month, with an 18-month commitment. After six months the price is closer to \$50.00 per month. I recommend checking the DISH Web site for current information at the time you read this review.

## Summary

I have been extremely pleased with my 722, and I think I represent two types of users: the technoid who enjoys playing with gear, and the other type of user who simply wants a piece of gear to turn on and work—and do what it has been represented to do. The 722 does this for me quite well. **WSR**



Allows selection of output format. A disappointment is the inability to select Native Output to allow the 722 to automatically pass the received format.



Each category brings up a subset of functions/preferences, when selected.



A setup option allows guide to only display HD programming

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