

## shoot review: hitachi z-dr1

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### A flexible hard disk recording system for Hitachi's professional SD cameras.

These days there's lots of excitement over HD, as in high-definition video gear. But there's a different kind of "HD" revolution going on as well — recording to digital hard drives instead of videotape. The new Hitachi Z-DR1 hard drive recording system for the company's professional family of cameras does that and more.

Now before you get that look in your eye, let me say that yes, I know, the death of tape-based media in professional video has been predicted for a long time. But disk-based technology has been long on promise and short on viable solutions until recently.

Hitachi's Z-DR1 is a simple, elegant digital recording solution for modern video-cameras. Teamed with one of several different Hitachi professional camera front ends at various prices, it allows the user to custom-configure a camera within budget. The product is the result of a collaborative effort among Hitachi Denshi America, nNovia Inc., Audavi Corp., and Blueline Technologies.

### The front end

But before we get into too much detail about the Z-DR1 hard drive recorder, how about the camera? I tested the recorder with the Hitachi SK-900 standard-definition camera, an Azden AT-897 shotgun mic, and an Anton/Bauer battery system. Hitachi offers many different cameras that are dockable with the Z-DR1, starting at around \$15,000 and ending upwards of \$45,000. Our evaluation camera is at the high end.

Let's get this out of the way up front — the SK-900 is a wonderful camera with all the professional features one expects. Mine featured a Fujinon HDTV zoom lens with DigiPower auto/manual variable power zoom. This hunk of glass, which accounts for almost half the cost of the tested camera, is a work of art and helps to produce gorgeous images at more than 800 lines of resolution. In fact to my eye, this combination has produced some of the best images I've ever seen in standard definition, so Fujinon and Hitachi have done something right. But the SK-900 offers more.

It's one of a very few SD cameras with a 14-bit analog-to-digital conversion chip (A/D). Hitachi claims that when compared to 12-bit A/D converters, this new chip represents a fourfold improvement in dynamic range and color gradation.

Hitachi's LSI video processing technology is also onboard. There are handy features like selectable 16:9/4:3 aspect ratio, auto flesh-tone detection with dual flesh-tone settings, and one-touch color temperature adjustment. The VBS (composite video) I/Os allow external input recording — as when the unit is being used as an ISO recording and composite video playback device for any purpose, such as pool feeds required by ENG crews. Everything you'd expect in a pro camera costing this much is there.

From an ergonomics standpoint, I found the shoulder-mounted camera a little front-heavy, even with the heavy-duty Anton/Bauer ProPac 14 power battery on the back. Balance is crucial in preventing camera operator fatigue.

### Hard drive recording

With the SK-900's outstanding feature set a given, let's move on to recording. Hitachi is no stranger to hard drive technology, and with the dockable Z-DR1 the company has created a field acquisition system that's cost-effective in the long run. I've never used an easier, faster way of moving digital video from the camera to the NLE postproduction environment.

Recording in the popular video clip formats (AVI and MOV), the Z-DR1 uses hot-swappable Mediapac drives in capacities from 20GB to 120GB. The 120GB model provides as much as six hours of recording time at 25Mbps. Hard drive prices range from \$140 for 20GB to \$450 for 120GB, making them fairly competitive with other digital media storage. Mediapacs are available from Hitachi and Audavi Corp., which created the HardTape technology on which the Mediapac is based. Mediapacs are actually Hitachi Travelstar 2.5in hard disk drives wrapped in a rock-solid metal-like covering with a power light and a I/O port, which connects to the optional USB 2.0 or IEEE 1394B transfer cables. Just pop a Mediapac in the camera as you would a tape, and you are ready to shoot.

The camera's controls are almost like those of every Betacam camera I've ever worked with, and I felt comfortable from the word "action." I shot with the camera over the course of a week in all the environments I could think of. From the beach at high noon to smoky nightclubs at midnight, the SK-900 performed flawlessly in the field — and then later in post.

Operating the Z-DR1 unit was simple. It has an LCD window that allows you to see the menus in every lighting condition except direct sunlight. The menu settings can be locked down. This is a good thing because while shooting, your head can inadvertently trigger various buttons if you forget to set the lock.

The VTR/HDD switch controls how you'll use the Mediapac, either in acquisition mode (VTR) or in transfer mode (HDD). The recorder also allows you to choose the kind of clips you want to record — AVI for PCs or MOV for the Mac. It then organizes the clips in various bins. You can have up to 99 bins with as many clips in each as the Mediapac's size will allow.



*The Hitachi ZDR-1 hard disk recorder is shown on the back end of the SK-900 SD camera. It's also designed to fit a wide range of other standard-def Hitachi cameras.*



*Side view of the SK-900/Z-DR1 combination. The LCD interface for the Z-DR1 is in the top right section of the camcorder.*

Wondering about timecode? The Z-DR1 accepts SMPTE timecode as an input via its TC BNC connection, and when it is present, the timecode recorded on the disk will be that of the input. If there is no SMPTE input, the Z-DR1 generates its own timecode, which is recorded with each video clip. The timecode (TC) is sequential and continuous, so you can match everything up when you edit the clips back to back. (Clip 1, TC start 00:00:00-end 00:32:15; Clip 2, TC start 00:32:16-end 01:07:02; Clip 3, TC start 01:07:03-end 01:12:25, etc.)

The recorded proprietary Sony timecode is not available as an output (the camera itself does not generate standard SMPTE timecode), but the Z-DR1 does accept external timecode generators as an input via its TC BNC connection. The TC BNC I/O allows input of SMPTE timecode when recording and SMPTE timecode output when in Playback mode. This allows multiple cameras to be linked in a shoot in which TC reference is used to synch up the footage during the edit.

Audio has not been forgotten with the Z-DR1 recorder. The monitor out provides a selection of audio channels to be output. You can have R-chnl, L-chnl, or a R+L-chnl mix. Select the mode by pressing the MIX button on the bottom right of the Z-DR1 control panel, then press the soft key on the LCD that corresponds to the mode you want. Balanced audio connectors are provided for audio out, left, and right. The menu choices allowed me to have one side for a voiceover and the other for ambient scene sound.

Aside from the camera's ins and outs, the current ZDR-1 incorporates USB 2.0, which offers transfer at a 480Mbps data rate, and FireWire (IEEE 1394B), which offers 400Mbps. The evaluation model Z-DR1 I/O provided only VBS (composite) genlockable video in and out, and a single bi-directional FireWire port. These allow traditional video import and export when your computer is connected directly to the camera and the Z-DR1, but it's when you eject a Mediapac HDD that the fun really starts.

## ZDR-1 in post

You really have to hand it to the engineers. They've taken the best of breed in technologies and molded them into a solution that's easy to work with. Once I was ready to edit, I pulled the Mediapac from the camera, attached a transfer cable, and connected it to my computer. The SK-900 was then taken out for more shooting with a fresh Mediapac while the other drive was put to use in the edit suite. I tried both cables (FireWire and USB2). While you should always transfer your media clips to your internal media drive or server, directly from a Mediapac I was able to play back realtime fullscreen video using the 1394B connector; I experienced stutters with the USB connection.

Once connected to the computer, the "MediaPac\_DV" icon appears on the desktop on the Mac (even with no drivers installed!) and in the Windows OS browser. Upon connecting the Mediapac to the computer, playback is immediate. In short order I was able to use the AVI clips with Adobe Premiere Pro 1.5 on the PC or the MOV video files with Final Cut Express on the Mac. In both cases, the media was available immediately. This is a huge time-saver — no more long digitization sessions; just shoot and the clips are ready for your NLE timeline and, OK, maybe a little trimming.

In operation, the Z-DR1 has a VTR mode and an HDD mode. In VTR mode, when connected to a PC, you can control it from most editing software just like a VTR. You can "scrub" fast-forward, rewind, play, etc., all in realtime. In the HDD mode, it acts like a digital storage hub and allows faster-than-realtime file transfers from the Mediapac to the computer. With the standard 4,800rpm Mediapac, users experience 10-14X realtime file transfers — or as fast as the actual drive's burst data speed specification, which is about 350Mbps.

At one point I could not see the clips on the computer. One thing I had to learn was that before moving to the editing stage, and so you can see the recorded video files on your desktop, you must use the Z-DR1's menu to perform a "Make Media Files" operation before ejecting the Mediapac. If you forget this, the video clips are not recognized by the NLE or the computer's operating system. Perhaps in a future update, Hitachi could make it so that the user cannot remove the Mediapac without doing this. At this price point I can want it all!

But make no mistake, you get what you pay for with the Z-DR1/SK-900 combination. It's nothing short of a top-notch camera system. The only disappointment was the fact that the I/Os on the Z-DR1 were a bit limiting. It's great that component analog with its improved chroma performance in both NTSC and PAL and IEEE 1394B is provided, but what about the even more prevalent YUV input/output for Betacam SP users?

There's also the limitation that the recorder can be used only with Hitachi cameras. But these are small potatoes when one considers all the pluses this camera system offers.

During NAB 2006 this month in Las Vegas, Hitachi will showcase the Z-DR1's updated features, including the incorporation of MXF file support for expanded compatibility with large-scale video servers. Mediapac video storage will be showcased, with increased capacities beyond 120GB and a new solid-state version (NAND flash memory). At the show, the Hitachi field acquisition system, including the Z-DR1, will be configured with several cameras and integrated with a network attached storage (NAS) server system. In addition, we'll see a new media management system and increased support for nonlinear video editing software applications. Rumor has it that Hitachi will be introducing a standalone Mediapac player.

If any professional shooter ever had a doubt about how easy and reliable hard disk recording can be, a short time with this product will convince him. No matter which camera front end it's teamed with, the Z-DR1 offers flexibility and convenient high-end features — as well as a bridge between analog and digital. If you or your video department can afford it, the Hitachi Z-DR1 with the SK-900 camera is an easy-to-use, professional video acquisition system. It produces outstanding visual results and allows fast media access from your NLE system.

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## bottomline

**Company:** Hitachi  
Woodbury, N.Y.; (516) 921-7200  
[www.hitachidenshi.com](http://www.hitachidenshi.com)

**Product:** Z-DR1 recorder

**Assets:** Dependable hard drive, instant NLE access via USB and FireWire, 14-bit A/D conversion, camera package configurability.

**Caveats:** No YUV or SDI I/O.

**Demographic:** ENG applications, government.

**PRICE: \$47,527 MSRP AS TESTED WITH THE SK-900. OTHER PACKAGES RANGE FROM \$15,000 TO \$39,000.**

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