If you're shooting with a **Panasonic** AG-HVX200 or a DSLR, you might want to take a look at Panasonic's HD camcorder, the AG-AF100. The AF100 is the first professional micro 4/3-inch video camcorder optimized for high-definition video recording, and it has some real advantages over the HVX200 or a DSLR.

If you already have the HVX200, you'll be used to a lot of the features offered by the AF100. The AF100 and HVX200 have about the same body size and other similarities, such as menus, timecode recording, built-in ND filtering, built-in stereo microphone, presets and color balance. The two XLR inputs with +48V Phantom Power capability and 48-kHz/16-bit two-channel digital audio recording are also about the same, except that the AF100 supports LPCM/Dolby-AC3 audio. There's also built-in iris control, and if you have a **VariZoom** controller left over from your HVX200, the iris, focus and record buttons will work on the AF100 as well. However, since there's no servo zoom on the camera, the zoom control has no job to do (and can take the day off).

What excites me about the AF100 is that it's very flexible. The first cool thing is that you can change its lenses. The 14–140mm zoom works pretty well for most applications, but you can use older SLR lenses that have an iris control on them, or even primes for cine work. I tried a 20mm f1.4 lens, which worked well indoors with available light. Since old SLR lenses are

inexpensive, I also tried a Dot Line Corp. micro 4:3 adapter and **Nikon** Nikkor AI lenses to get a really nice look for not a lot of money.

If you're a DSLR owner, the reason to upgrade to the AF100 is for its micro 4/3-inch, 16:9 MOS imager. With dramatically reduced video aliasing, the AF100 delivers the shallow depth of field and wider field of view of a DSLR large imager, with professional HDMI and HD-SDI output that can connect to external recorders or monitors. This camcorder records 1080 (60i, 50i, 30p, 25p and 24p native) and 720 (60p, 50p, 30p, 25p and 24p native) in AVCHD's highest-quality PH mode (maximum 24Mbps) codec. Additionally, it is 60Hz and 50Hz switchable for use worldwide. Part of the AF100's charm is its vast recording ability. The built-in AVCHD recorder can record a full native 1080/24p or 720/24p recording (at variable frame rates) with professional audio capabilities to SDHC and SDXC media (which supports memory capacities above 32GB up to 2TB). And with two SD slots, the AF100 can record up to 12 hours on two 64GB SDXC cards in PH mode. The built-in recorder is fine, and very handy, but the true capabilities of this camera are found in external recorders.

The Atomos Ninja recorder for **Apple** ProRes recording is a10-bit production weapon for HDMI-equipped cameras like the AF100. Ninja preserves the pristine uncompressed video quality from the AF100's camera sensor by encoding it directly into the ProRes format in 422, LT or HQ. Then it goes straight to the timeline of your NLE. It's a fast, high-quality workflow with just a few simple steps.

First, connect the Ninja Docking Station (which is included in the kit) to your Apple Mac using the FireWire 800 port (USB 2.0 will also work). Insert the Ninja Master Caddy containing the solid-state drive (SSD) with your footage into the Docking Station, and you will see the drive appear in your finder window. Start FCP and open your project (or start a new one), then go to the file menu and select "Import>Folder" so that FCP will show you a "Browse" window. Look for the Ninja drive and click on it so you can see the folders inside.
Select the folder containing the footage you want to import and click on "Choose," and go back to your FCP project window. Your "Scene, Shot and Take" folders now appear in the project window ready for use in your FCP project. With your Ninja loaded with an SSD, you have instant, random ("Non-Linear") access to your material, eliminating the need for log-and-capture using a standard capture card. Keep in mind that HDMI can't support 24fps, so the Ninja will record at 60fps, and you can convert the footage on the way into your editing system.

You can edit right from the SSD drive in the Docking Station and export a finished movie. However, be aware that the media is still only on your SSD, so you'll want to copy your files to another drive before erasing your SSD. My goal is to have my footage archived in at least three places. My Thermaltake BlacX 5G Duet Docking Station will accept two 2.5 or 3.5 hard drives, so it's easy to pop in a couple of raw drives (no case needed) and make two copies of my data. Another way is to pop in the SSD and a second drive and make a copy of the SSD. In addition, there's my **Seagate** SAS RAID and G-Technology G-SPEED Q RAID for additional backups. With the AF100, the bad news is that you have to keep track of your data. The good news is that you don't have to purchase or deal with videotape.

The Ninja arrives as a complete system, so you don't have to add anything except a 2.5-inch

SSD and some cables to suit your setup like HDMI. (All other parts necessary to use the Ninja are included in a very nice carrying case.) Disk-drive data rates tend to be given in megabytes (MBps) per second and codec data rates are normally given in megabits (Mbps) per second. All you have to do to convert megabits to megabytes is divide by eight. So if you set the Ninja to record at 220 megabits per second, instead of the AF100's AVCHD highest-quality PH mode (maximum 24Mbps), that's going to result in 220/8 megabytes per second, which is 27.5 megabytes per second. This takes up some memory.

Luckily, SSD drives are flash memory devices that come in the same form-factor as 2½-inch disk drives, and they're fully supported by the Ninja. The Crucial SSD that I use records 512MB, which is much more space than the 112MB that are available inside the camera using two 64GB cards. When you have filled up an SSD, you simply pop it out and plug in another one, much like a giant P2 card. The reason that you use SSDs instead of regular 2½-inch hard-disk drives (HHDs) is that regular drives are particularly sensitive to motion. If you move too quickly while the drive is spinning, you may get a small gap in your recording. While 90 percent of your production work will most likely be OK on a standard drive, SSDs are the way to go while working in a challenging environment.

The Ninja mounts in the hot shoe on top of the camera, and provides a monitor for viewing and playing back your recordings. The touch-screen controls are very handy and easy to navigate. Changing codecs is as easy at touching the icon on the screen. This product absolutely rocks on the AF100 camera. It's lightweight, portable, has built-in SSD formatting and the ability to plug the Ninja directly into your computer for editing. The touch-screen monitor is easy to use and recording is rock solid. Add in the fact that this device is less expensive than other similar ProRes HQ recorders, and you end up with a great value for your money. The Ninja's standard one-year warranty on all parts and accessories is upgraded to three years on the Main Ninja Unit alone (excluding TFT/LCD) by registering your Ninja online.

If you like working in uncompressed, and have a RAID big and fast enough to handle the format, the **Blackmagic Design** HyperDeck Shuttle is for you. It can also improve the quality of the AF100. This time the uncompressed signal from the AF100 is not compressed into AVCHD (24Mbps) in the camera or ProRes HQ (220Mbps) in the Ninja, but rather is recorded in uncompressed 10-bit HD (1280Mbps) in the HyperDeck Shuttle. It's an 8-bit camera, so there's a bit of waste recording at 10 bits — but, hey, it's uncompressed.

Compression always destroys some image quality, so this is a great option if you need to get the most dynamic color range for color correction and perfect, clean keying without jagged edges. The downside is finding storage space. My Crucial 512GB SSD will only hold about an hour's worth of data. The HyperDeck Shuttle bypasses your camera's compression and records from SDI or HDMI in the universally compatible, uncompressed QuickTime files. These files can be used with all popular software packages, like Final Cut Pro, **Adobe** Premiere Pro, After Effects, **DaVinci** Resolve and Apple Color.

Like the Ninja, you can edit directly from the SSD media itself, the difference is that you'll need to pop the SSD out of the HyperDeck Shuttle and use your own Docking Station to connect to

your editing computer. My Thermaltake BlacX 5G Docking Station works with all standard 2.5-inch or 3.5-inch SATA/SSD to USB 3.0 for transfer rates up to 5Gbps. It's compatible with SATA I/II/III and SSD HDDs. I use the latest Mac OS X, but it's also compatible with Microsoft Windows 7/Vista/XP/2003/2000. This model holds one drive at a time, so I can edit on this docking station while its brother, the Duet 5G, makes backup copies.

The HyperDeck Shuttle has standard deck-style function buttons (clearly marked and easily accessible along one side) as well as LEDs that indicate recording status, battery status and input signal lock. I find it very easy to use. It's like operating a VTR. Since this device has no built-in monitor, you'll need to buy a pair of SDI or HDMI cables. One cable will go from the AF100 into the HyperDeck Shuttle, and the other will feed the signal out of the HyperDeck Shuttle to your monitor.
The HyperDeck Shuttle works well for a quick on-set QC or client preview. I either use my Plura Broadcast PBM-070X 7-inch on-camera monitor, with its built-in Waveform and Vectorscope, or my 2s2 17-inch monitor. Connected to the HyperDeck Shuttle via HDMI or SDI cables, the uncompressed signal looks awesome. The Plura PBM-070X is great for indoors or camera-mounted work, and the 2s2 monitor can be seen from 6 feet away with no hood, even when outdoors in full sunlight. The HyperDeck Shuttle is compact and battery powered so it's perfect as a field recorder. If you're looking for an affordable uncompressed 10-bit recorder, look no further. Here are some other helpful accessories that you might find useful.

[redacted]