



**digital video instruction**  
**camcorder selection guide**

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## Camera Size

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Always try a camcorder before buying. If you'll be shooting handheld, make sure it's comfortable to hold and not so heavy that you'll end up with a sore arm. A camcorder with a side-loading cassette hatch is your best bet if you'll be using a tripod frequently. In general, look for a control layout that provides quick access to the most commonly used functions via buttons or other physical controls, and a menu system that's simply structured and intuitive. Look for a camera that responds quickly and accurately to both your commands and changes in the scene you're shooting. See whether the autofocus responds quickly and accurately to changing scenes or hunts around, trying to lock onto a subject. You should also be able to control the zoom speed easily and the autoexposure should adapt appropriately to lighting changes.



Normal Sized "Vertical" Camcorders



Larger Sized "Horizontal" Camcorders



Mini Sized "Compact" or "UltraCompact" Camcorders

## Video Format

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**Digital models** come in two formats, with some models weighing less than 2 pounds.

**MiniDV (digital).** With some models small enough to slip into a large pocket, MiniDV can record very-high-quality images. MiniDV camcorders use a unique tape cassette, smaller than either a VHS-C or an 8mm cassette but more expensive--\$6 for a 60-minute tape. Typical recording time: 60 minutes at SP. You'll need to use the camcorder for playback--the camcorder converts its recording to an analog signal, so it can be played directly into a TV or VCR; a TV or VCR with an S-video input jack will yield the best possible picture quality. Brands include Canon, JVC, Panasonic, Sharp, and Sony. Price range: \$500 to \$4,000.



**Digital 8 (D8).** This format gives you digital quality on Hi8 or 8mm cassettes. Tapes are cheaper than MiniDV cassettes. Most models can also play your old Hi8 or 8mm tapes. But D8 records with a faster tape speed, so a "120-minute" cassette lasts only 60 minutes at SP speed. Price range: \$550 to \$1,300.

**Analog camcorders** come in four compact formats (8mm, Hi8, VHS-C, and S-VHS-C), weigh around 2 pounds, and, like digital models, are designed to be easily held in the hand. Picture quality is adequate and can be quite good, though generally a notch below that of digital.

**8mm.** For this analog format, you also need the camcorder for playback. Picture quality of models recently tested varied from poor to fair; sound quality, good to very good. Cassettes hold a lot: The most common size, 120-minute, yields 2 hours at SP and 4 hours at LP and costs about \$2.50. Samsung and Sharp make models in this format. Price range: \$250 to \$500.

**Hi8.** This premium "high-band" variant of 8mm promises a sharper picture. For full benefits, you must use Hi8 tape and watch on a TV set that has an S-video input. A 120-minute cassette holds 2 hours at SP and costs about \$3.50. Brands include Canon, Samsung, Sharp, and Sony. Price range: \$300 to \$800.

**VHS-C.** This format uses an adapter to play in any VHS VCR. Cassettes most commonly hold 30 minutes on SP. JVC and Panasonic are among companies that make models in VHS-C. Price range: \$300 to \$700.

**Super VHS-C (S-VHS-C).** The high-band variation on VHS-C. (The similar S-VHS/ ET-C subformat can use standard VHS-C tapes.) One tape yields 40 minutes at SP recording speed. Only JVC offers models of this format. Price range: \$500 to \$700.

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If you want to edit your footage on a computer, a camera that records in the DV format will be your best option. Look for a camera that uses MiniDV cassettes or a Digital8 model that records DV onto 8mm and Hi8 tapes. If you're not going to do a lot of editing, you might consider a MicroMV or mini-DVD camcorder. Both record MPEG-2 video, the former onto a tiny cassette that enables extremely compact camera designs, and the latter onto an 8cm (3-inch) DVD-RAM or DVD-R.

Some camcorders record MPEG-4, which is acceptable for use on the Web and in e-mail but doesn't match the quality of the other digital-video formats. Many recent models allow users to capture MPEG-1 clips on a flash memory card--usually a Sony Memory Stick or SD/MMC media. If you'd like to be able to create e-mailable clips as well as high-quality video, look for this option.

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### **Lens Type and Quality**

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There are two types of zoom: Optical and Digital. Optical Zoom is handled within the lens itself. Digital Zoom is handled inside the brains of the camcorder. Some manufacturers hype up the digital zoom capabilities of their cameras stating their camera has "Up to 500x Digital Zoom!" or even as high as 700x... While this sounds fantastic, you really never want to use footage in a video that you achieved while using the Digital Zoom feature. The way it works, is that the lens can zoom a certain amount - once this level has been surpassed, your camera shifts to Digital Zoom. Most of the time, a digital zoom will result in poor picture quality, choppy images, and a noticeable presence of square pixels on the screen.

The broader the optical zoom range, the more shooting flexibility you'll have. Camcorder zooms start at 10X magnification, which should suffice for most users. Again, don't confuse optical zoom with digital zoom: the higher the digital zoom magnification, the more image quality deteriorates. Look for a lens with a maximum aperture of f1.4 or f1.6 for the best low-light performance. And we highly recommend optical image stabilization, because it keeps the picture steady without degrading image quality as much as digital stabilization does. Hobbyists should look for a camera with manual focus capability, especially one that uses a focus ring on the lens instead of a switch. A lens that's threaded to accept filters and lens converters will also benefit advanced videographers.

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### **Video Sensor (CCDs)**

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Larger, higher-resolution CCDs contribute significantly to better image quality. Sensor sizes in consumer camcorders generally range between 1/6 and 1/3 of an inch, and resolutions usually fall between 300,000 pixels and 1 megapixel per CCD. When you compare cameras, look at effective resolutions instead of gross sensor resolutions. Hobbyists and semiprofs should opt for a three-CCD camcorder: it will deliver better color rendition and fewer image artifacts than a single CCD. Progressive-scan CCDs also produce better image quality than interlaced sensors, especially for

stills. However, shooting video in progressive-scan mode results in jerkier footage; some people prefer this look for its "filmlike" quality. Read the product information carefully if you're looking for progressive scan, since some vendors use misleading language to describe features that merely imitate true progressive scan.

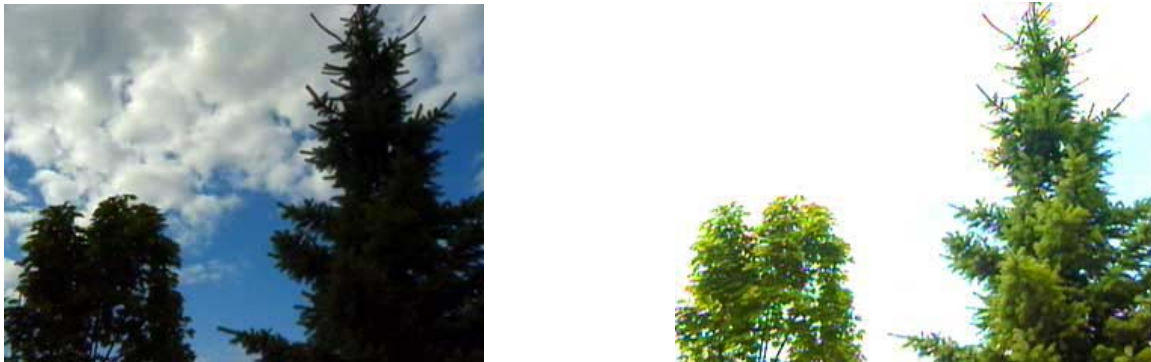
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## Exposure Control

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Every digital camcorder has a fully automatic mode that lets you simply point and shoot, but it's best to be able to adjust your exposure setting a little. Look for a model with exposure shift (a.k.a. exposure compensation). Special shooting modes for capturing subjects lit by a spotlight or other specific sources can be helpful, too. For full control over exposure, you'll need a camera that lets you manually set both the aperture and the shutter speed. Advanced camcorders offer zebra stripes, which highlight overexposed areas with a striped pattern so that you can fine-tune exposure. Low-light performance is the Achilles' heel of many camcorders. Look for a model with a minimum lux rating of seven or lower. Many camcorders offer special low-light shooting modes, but they don't all work the same way. Some simply slow down the shutter speed so that you get full-color but impressionistic-looking footage. Others use an infrared emitter to capture greenish monochrome video in total darkness. If you'll be shooting in low light frequently, look for a model with a built-in video light or flash (for stills), or an accessory shoe that will support external lights.

These figures show two exposure settings when shooting dark foreground objects.



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## Focus Control

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Focusing on stationary objects from a stationary camera position is easy. However, auto-focus is very useful when you or the subjects you are shooting are constantly moving. It frees you from having to worry about focusing, so you can concentrate on following the action and keeping the shot composed. In addition, the viewfinders in many consumer camcorders have low resolution. A shot that appears to be focused in the viewfinder might be out of focus on a full-size monitor

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## Color Control

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All digital camcorders offer an automatic white-balance setting that calculates the right color balance for your shot, but the results can be erratic. Look for models that let you select among white-balance presets for particular types of lighting, such as sunny, cloudy, incandescent, and fluorescent. Many camcorders allow you to set white balance manually, and that's the most dependable method. You take a reading from an area that you want to appear as pure white in your video, then the camera uses that reading to calculate the color balance. Some semipro cameras allow you to fine-tune adjustments after setting the white balance, as well as to make manual color gain (saturation) adjustments. Advanced videographers who will be editing and color-correcting their footage should look for a model that displays SMPTE color bars.

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## Still Picture Quality

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Everyone wants a camcorder that shoots great stills; after all, nobody wants to carry two devices that essentially perform the same task. Unfortunately, most camcorders use fast but low-resolution, high-noise sensors, which creates video that looks great on a device such as a television but pretty bad on a PC monitor or printed as stills.

These cameras are finally beginning to appear, though you still can't capture high-resolution, 8x10-worthy stills. The best you'll be able to do right now is a model with good color, low noise, and at least 2-megapixel resolution. The camcorders that take the best stills are pretty expensive, and the pictures they capture will suffice for only small-scale printing or onscreen display.

One great benefit to camcorders is that each second of video will allow 30 individual "frame grabs" that will look great if they are little web sized pictures. Anything larger and the image will become pixelated.

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## ViewFinder and LCD Screen

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More pixels usually mean better viewfinder and LCD image quality. Look for a sharp LCD that's easy to see in bright light; adjustable screen brightness helps, too. The larger the LCD, the easier it will be to see (and the more power-hungry it will be); for all but ultracompact camcorders, look for at least 2.5 inches. An EVF that you can tilt with a diopter lever for adjusting focus will give you more shooting flexibility. Almost all EVFs and LCDs on consumer camcorders display color, although some video enthusiasts prefer black-and-white EVFs, which can make it easier to judge exposure. Touch-screen LCDs have begun to appear on a few consumer models, usually for menu navigation and spot focusing. Some users find them convenient, while others prefer not to have to use the LCD to access camera controls.

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## Stabilization System

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Many camcorders today have a system for steadying the image as you shoot. Sensors in the camcorder send motion feedback information to a system, either optical or electronic, that shifts the image slightly to reduce small, jerky movements. It doesn't compensate for bad camerawork, but it can help smooth out a shot when you can't stay perfectly still.

Use the camcorder's menu to turn the feature off and on. Zoom in to a tight shot of a distant object, and notice how steady shot affects the image. You might notice only a small effect, but every little bit helps. Experts say you should disable the SteadyShot or electronic stabilization features when you are using a tripod, as the anti-shaky feature can cause blurring and decreased video quality.

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## Audio Control

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Most camcorders capture 12- and 16-bit audio with a built-in microphone. Look for a camera with a front-mounted, directional microphone, because they capture the sound they're pointed at most effectively. Almost all camcorders have a minijack for plugging in an external microphone, but if you're going to use that option often, look for a camera with an accessory shoe that accepts external mics. A headphone jack is also helpful when audio quality is critical, since it will allow you to listen to the audio that's being captured by the camera. Advanced videographers who want to use high-quality external microphones should look for a camera with manual audio level controls and XLR compatibility (usually available through an optional or third-party adapter). Sony's VX2000 has manual audio controls but no XLR compatibility.

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## Other Cool Features

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**Analog to digital conversion** or "passthrough" is a feature included on most new camcorders that will allow you to plug in an analog signal from something like a VCR or a Hi8 camcorder while outputting a DV signal. You can convert old VHS tapes this way. Simply hit "play" on the VCR, connect the Yellow Red and Blue RCA cables to your DV camcorder, and use your video editing software to capture the digital files to your computer. The analog signal and the older VHS / Hi-8 footage can be converted on-the-fly to your computer. It's a great feature if you have a lot of older tapes that need to be converted into the DV format.

**USB Web Streaming** is included on many models. These camcorders include a USB cable for you to transfer pictures, short video clips (some models), and streaming live video to the web. Although I have never done this, it seems like a great feature for someone who may want a loved one to "be there" while they do something in a different part of the country or world. I got an email from a grandfather who needed help set up web streaming for his grandson in a different part of the US.

## Other Helpful Information

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### Places to Rent Cameras in Boston Area

Boston Camera

<http://www.boscam.com/>

Rule Broadcasting Systems (Watertown)

<http://www.rule.com/bigRequest.cfm>

Film Shack

<http://www.filmshack.com/>

### Stores to Buy Cameras in Boston-area

**Newtonville Photo and Video** – Good Service, Knowledgeable Sales Staff

<http://www.nvcamera.com/html/home.html>

**Best Buy** – Usually have the majority of hobby-level cameras. Sales staff is sometimes painful ignorant of digital video terminology.

### DV Tapes

**B&H Photo Video Pro Audio (online)**

[http://www.bhphotovideo.com/bnh/controller/home?O=details\\_accessories&A=details&Q=&sku=132812&is=REG](http://www.bhphotovideo.com/bnh/controller/home?O=details_accessories&A=details&Q=&sku=132812&is=REG)

At BH you can get tapes for half the normal store price and if you buy in packs of ten or more, you get discounts.

### More Information

Please send me an email or check out my online information below.

Thanks and happy shooting!

Brian Henderson

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