

Camcorders



Table of Contents

Introduction	3
....what kind of videographer am I?	3
....which camcorder is right for me?	3
Recording Media	4
MiniDV	4
DVD	4
HDD (Hard Disk Drive)	4
P2 Memory Card Recording	5
Removable Media	5
Key Features	5
Resolution	5
Scanning	8
Lens Quality	9
Interchangeable Lenses	9
Which camcorder for me?	9
Additional Features: A Glossary	10

Introduction

Home video has come a long way in a short time. From the large and often unwieldy VHS camcorders that were popular into the 1990's, video has experienced a revolution. Digitization and miniaturization are just two of radical changes that have made video more affordable, easier to use – and much higher in quality. No matter what level of videographer you are, or plan to become, this is an excellent time to step into the medium - or step up to a higher level.

From lens to battery pack, CCD to LCD, and MiniDV to 24p, there is much to consider before purchasing the camcorder that will do the job for you. Here at Vistek we carry camcorders for the home movie hobbyist, the budding independent filmmaker, as well as the seasoned professional. With video, the price range can be wide, stretching from a few hundred dollars to as much as fifteen thousand. So you'll want to find the camcorder that meets all of your needs without stepping outside of your budget. This guide has been written to arm you with the knowledge of features and terms that will help you make an informed decision, so you get the most from your video making experience. There's also a glossary of terms at the end of the Guide.

....what kind of videographer am I?

For the purpose of this Guide, we've identified three categories:

1) The home video hobbyist

Your main goal is to record personal events such as vacations, amateur sports, family parties and get-togethers. You may never need to edit the video footage you shoot, merely play it back uncut. Manual features are less of a requirement. Compact size is a priority, as is ease of use – and of course, affordability. Fortunately, there are many quality camcorder models to choose from at this level.

2) The aspiring prosumer

Like the hobbyist, you may also want to record family events – but you plan on editing your videos later using your home computer. Perhaps you or your kids will use the camcorder for school projects where the final result will be shown in class. Certain features will be necessary, such as the ability to attach a remote microphone, adjust focus manually, etc. You're willing to spend a little more for higher quality features.

3) The experienced pro

You're familiar with videography and may be looking to use your camera professionally, or simply obtain the highest quality video images possible. Resolution, colour, and tack-sharp clarity are important to you. You'll definitely be editing your footage, so you'll want to use a format that's compatible with your editing software. You may be using special lighting, add-on lenses and additional audio equipment. You're willing to pay for pro quality – remember, there's a wide range to consider at this level.

....which camcorder is right for me?

While the professional videographer may demand the highest resolution possible, an indie filmmaker or home movie auteur may have to make some sacrifices in quality in order to fit their budget. That said, many lower priced camcorders include features designed for the home moviemaker who does want to capture moments but not worry too much about the technical side of things. Thankfully, there's a wide range of camcorders on the market, with qualities and features aimed at all types of video buffs.



Recording Media

One significant way to categorize camcorders is by the way they capture images. Not long ago, video was available in “analogue” or “linear” format only. You captured images on tape, and then in the process of editing, copied selected scenes on to more tape. Image resolution went down with each generation – one reason why many old home videos seem to suffer in quality when viewed today.

Digital has changed it all. Today almost all formats are digital, meaning even the most basic camcorder delivers good quality. From MiniDV tape to DVD to tapeless Hard Disk Drive, the choices are all digital – and all very good.

MiniDV

This is still the most popular format. Entry level as well as many prosumer HD camcorders write their digitized information to MiniDV tapes. MiniDV tapes are readily available at Vistek, but if you’re away from home, you can usually rely on the corner store to have some in stock. Most standard definition camcorders get 60 minutes of high quality footage recorded on each tape. (Note: tapes can be reused, but there is a slight drop in quality, so re-recording is generally not recommended).

DVD

Camcorders that burn straight to 3” mini DVD disks allow you to pop the disk out of the camcorder and place it directly into any home DVD player for playback. DVD Camcorders tend to be reasonably priced, and the random access of the DVD format means there’s no need to fast forward or rewind. However, the recording times are less than MiniDVD format, and there are limits to the editing capability. DVD’s main benefit is instant playback gratification.

HDD (Hard Disk Drive)

A camcorder that records straight to an internal hard drive requires no consumables like MiniDV tapes, so there’s no risk of damaged or lost tapes or DVDs. How much you can shoot before transferring the recorded information to some sort of external media varies from camcorder to camcorder. If you only shoot a few memories here and there, you can spend less and purchase a camera with fewer gigabytes (GB). For example, a 4GB camcorder can hold about one hour of recording time, while a 30GB model holds seven hours. Image quality is excellent, particularly for camcorders with such small bodies. Just be aware that HDD is a new, evolving format and there may be compatibility issues if you plan to edit your footage.

P2 Memory Card Recording

With a massive 16GBs, and with no drive mechanism, maintenance costs are much lower. The P2 memory card boasts excellent endurance against impact, vibration, temperature change, and dust. It's an important benefit when you're capturing important footage.

Removable Media

A recent trend in media for video makes use of Secure Digital (SD) or Memory Stick cards, the same kind of media used in digital still cameras. The tiny size of these cards allows for extremely compact camcorders. If small size is a priority, these pocket-sized camcorders may be a good alternative. Like DVD and HDD systems, camcorders using this type of media allow random access. You can expect to see this format grow in popularity.

Key Features

It stands to reason that every quality improvement involved in the construction of a camcorder will impact on its price. Listed below are some of the main features that factor into both price and quality.

Resolution

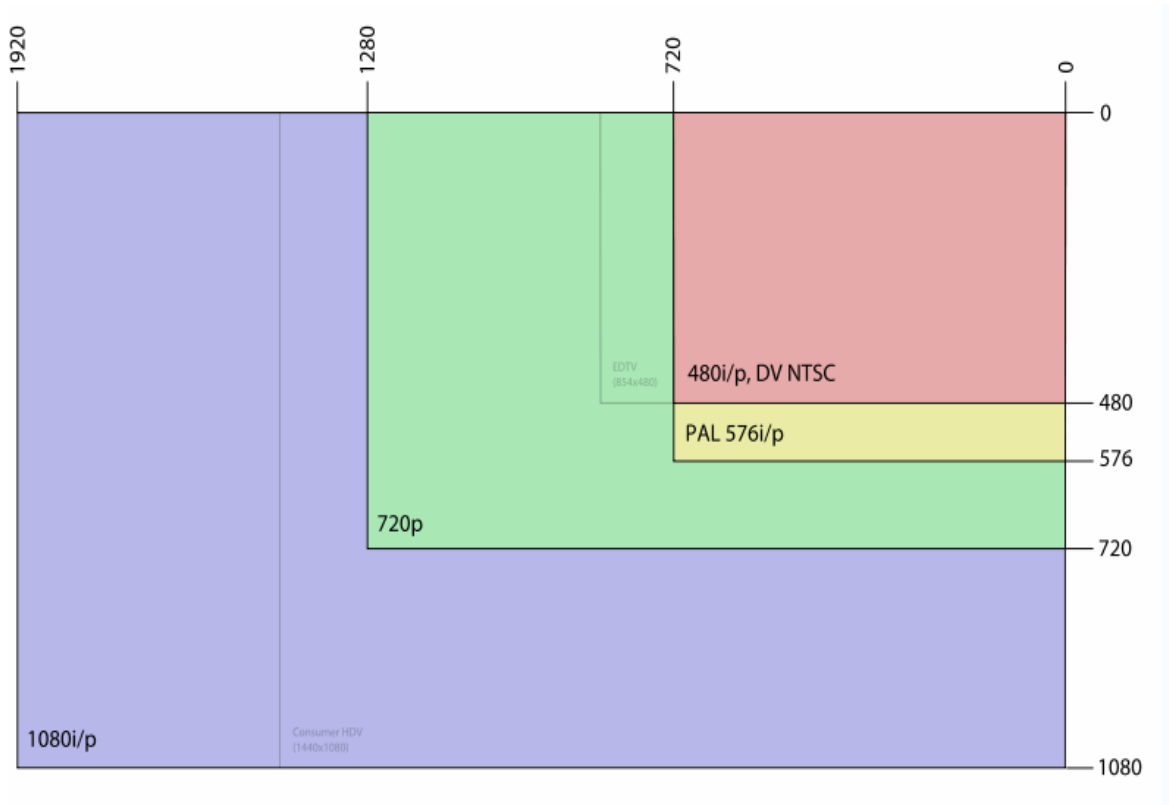
A higher resolution means there are more pixels capturing information, which means higher quality images. The CCD or CMOS image processor or chip (see below) converts a visual image into an electric signal which the processor converts to digital information. Generally, the larger the CCD or CMOS, the greater the price and resolution of the image – although the power of the processor is just as important as the size of the capturing device.

3CCD

Some camcorders split the light going into the camera into three channels, via a glass prism. 3CCD systems devote a separate CCD to red, green and blue, resulting in more information, higher resolution and greater colour fidelity. Once a pro feature only, 3CCD systems are now available on more affordable prosumer models.

HD

The next step up in resolution is high definition (HD). The systems discussed so far have been standard definition. But if you're familiar with the look of high definition television – much greater detail, colour clarity and dramatically improved sharpness – you'll appreciate the same kind of result available from an HD camcorder. While regular definition captures 486 lines of pixels, high definition systems capture 720 to 1080 lines of pixels. Not only does this translate into more detail captured in the frame, it also allows you to shoot in widescreen mode (16:9), which resembles the cinema format. Naturally, the significant difference in image quality between standard and high definition is going to be felt in the price. But as HD becomes more popular, prices adjust accordingly. If you play your footage back on an HD television – or plan to move up to "high def" in the near future – an HD camcorder may be the way to go.



The lines of resolution various formats use. Notice the widescreen aspect ratio of the 720 and 1080 high definition resolutions.

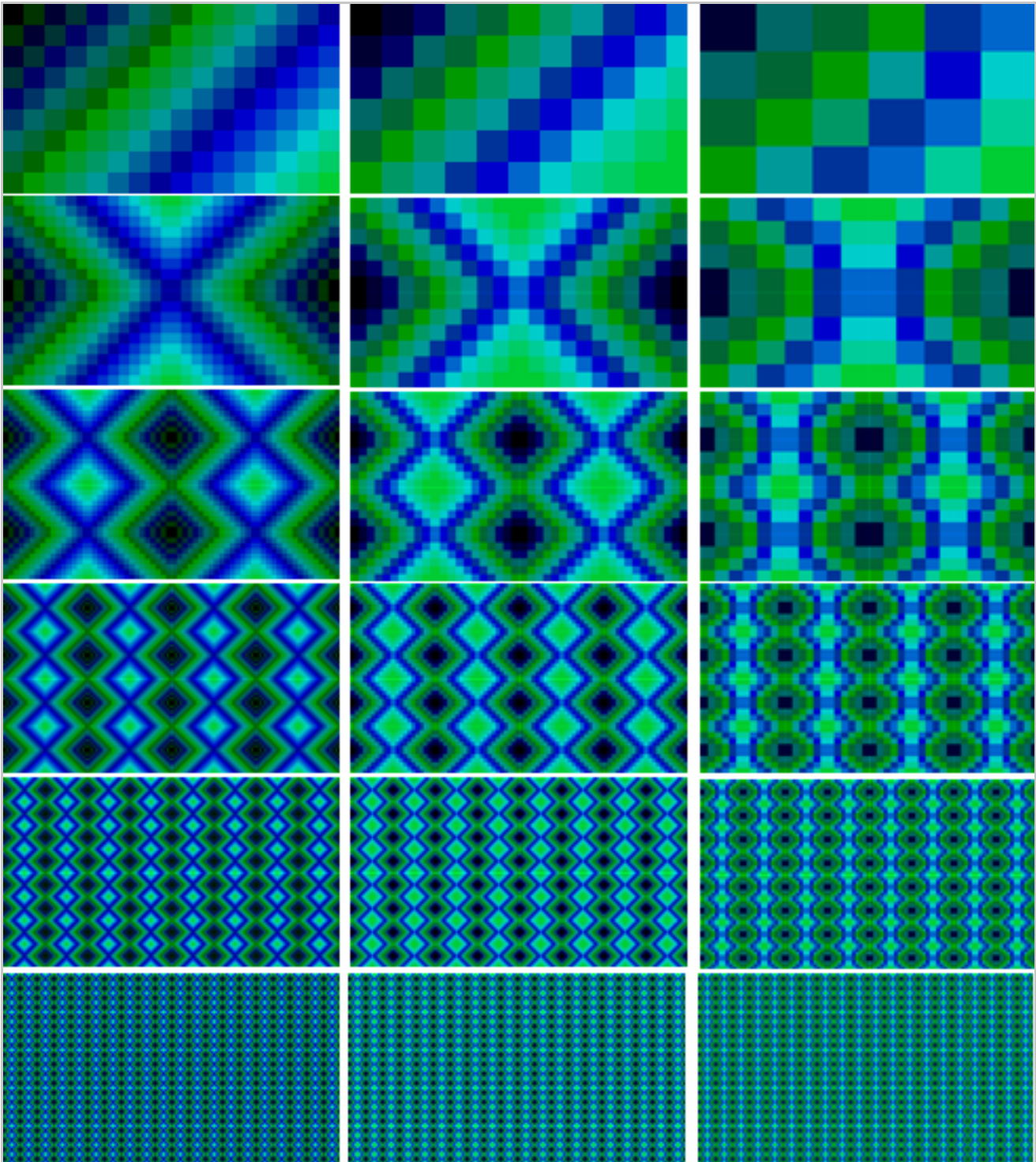
Relative resolution
(not actual resolution):

(top row) standard definition
stretched to 16:9

(middle row) 720 resolution

(bottom row) 1080 resolution



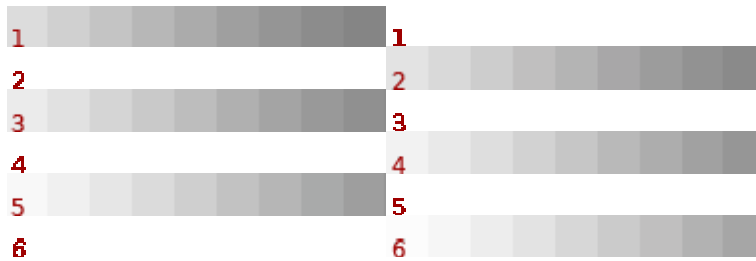


These columns compare 1080 (left), 720 (center), and stretched standard definition (right) resolutions, zoomed in 40x (top row), 20x (second row), 10x (third row), 5x (fourth row), 2.5x (fifth row), and no zoom.

Scanning

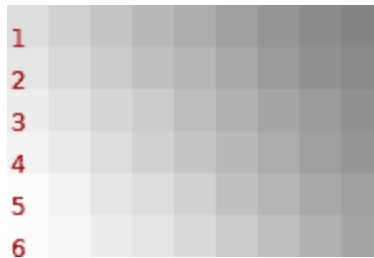
There are two ways a camcorder can scan a video image: interlaced and progressive.

Interlaced Scanning



In an interlaced scan, a video field displays the odd lines of an image, and the next field displays the remaining lines. Interlaced scanning requires less bandwidth and refresh time, resulting in a less expensive video system and superior capture of high speed movement.

Progressive Scanning



In a progressive scan, a single frame receives all of the image's information. Progressive scanning displays the highest possible detail in an image, and avoids the flicker problems and artifacts that may arise with interlaced scanning. As you might expect, camcorders with progressive scanning abilities tend to be more expensive.

Designation	Examples	Definition (Vertical Lines)	Interlaced (Fields per second)	Progressive (Frames per second)
Standard	SDTV, SVCD, DVD, DV	480 (NTSC) 576 (PAL, SECAM)	60 50	24, 30 25
High	HDTV, HD DVD, Blu-ray Disc, HDV	720 1080	- 50, 60	24, 30, 60; 25, 50 24, 30; 25

Frame Rate

The way motion appears in your scenes depends on how the image is scanned, and the frame rate used. More options, especially the use of 24p, add to the cost of the camcorder.

60i

60 interlaced fields a second (29.97 frames). For years this frame rate has been standard for television broadcast signals, DVDs and home camcorders.

30p

30 progressive scan frames per second. This frame rate avoids interlace signal artifacts, and portrays moving subjects clearly.

24p

Because it mimics 35mm film's 24 frames per second, this frame rate is designed for achieving the "film look". It's also the perfect frame rate for those planning to transfer their video to film in post production.

For special high speed or slow motion effects other frame rates are also available on some camcorder models. For example, golfers like to play back their golf swing in slow motion in order to analyze it.

Lens Quality

The bigger the optical zoom, the closer you can get to distant subjects, but that also means a more complicated lens structure and increased price. Digital zooms crop the image and uses interpolation to “zoom” in on a subject, usually resulting a loss of image quality. When evaluating a zoom lens, be sure to look at optical, not digital zoom capability. In addition, some camcorder lenses have special coatings that reduce glare and increase sharpness.

Interchangeable Lenses

When it comes to creative choice, even the most outstanding zoom lens fused to the camcorder body is no match for an interchangeable lens system. Interchangeable lens capability is a feature found in higher end camcorders. If you’re planning to develop an arsenal of high quality lenses, you’ll definitely need a pro level camcorder to utilize them.

Which camcorder for me?

Now that you’re armed with more information on camcorders and video in general, let’s return to the basic question, “How will you use it?” The chart below summarizes many of the ideas discussed. Be sure to consider your own needs. For example, you may be a “Hobbyist” who shoots a lot of soccer, hockey or Little League baseball. While you don’t need every high-end feature, a large optical zoom that lets you capture action in the field is a real priority. So you may find that your own style of shooting falls somewhere in between the main categories. No problem. With this Guide and the assistance of your Vistek salesperson, you’ll find a video camera that easily fits your needs and budget.

Type of Shooter	Camcorder Format	Playback	Transfer to Computer	Editing Capability	Important Features to Consider
Hobbyist	DVD	Easy playback on DVD player	USB	Basic	<i>Your wish list</i>
	HDD	Connect to TV or PC	USB	Basic	
	Memory Card	Connect to TV or PC	Card reader	Precise editing with compatible PC and software	
Prosumer	Mini DV	Connect to TV using supplied cables	Connect to PC using Firewire or IEEE 1394	Precise editing with compatible PC and software	<i>Your wish list</i>
	Memory Card	Connect to TV or PC	Card reader		
Professional	Mini DV	Connect to TV using supplied cables	Connect to PC using Firewire or IEEE 1394	Precise editing with compatible PC and software	<i>Your wish list</i>

Additional Features: A Glossary

Many camcorders come with a number of additional features designed to provide a smooth and effortless shooting process. Chances are, no one camcorder includes all the features listed below. The key is finding a model with the features you'll use for your own type of videography.

Auto Slow Shutter Function

Ensures perfect exposure in low light by lowering your shutter speed. This will cause some interesting motion effects as well.

AVCHD

A new format for hard disk recording which makes use of a special compression formula that retains excellent colour, detail and crisp audio – and requires less storage.

Built-in Flash

Permits shooting of digital still images in dim areas

Built-in Lens Cover

Opens and closes automatically with Power switch - no worries about dangling or lost lens covers

Built-in Video Light

A white LED allows for video recording in low-light conditions

Cable-Free Operation

Found on DVD camcorders which require no connections for video playback, as the DVD can be placed in most DVD players for instant viewing of footage.

Colour Viewfinder

Allows user to preview and compose scene without using LCD, extending battery life

Digital Photo

Allows you to take digital still images separately from video – usually at a much lower resolution than most dedicated digital still cameras provide

Easy Mode

Simple, all-automatic mode ideal for people new to video, much like “Auto” setting on point and shoot still cameras

Edit With Disk Navigator

Allows editing of scenes “in camera”, such as deleting or re-arranging order

Enhanced Battery Life

Advanced form of battery allowing more time between charges

Exposure Lock

Allows video shooter to zoom in and lock exposure settings then re-compose

Fader Effects

Built-in video transitions feature allowing blending of scenes with black, mosaic, monotone or white fades

Firewire/IEEE1394 DV Terminal

A high-speed connection between camcorder and computer, permitting rapid transfer of video footage

Hard Disk Drive (Smart Protection)

Safety feature: If camcorder is dropped, the power to the hard drive is turned off and video is recorded to a buffer

Help Mode

Built-in explanation of camera controls on LCD monitor using icons

Image Stabilization

Highly useful feature, allows smoother shooting when panning, zooming, moving, or recording without tripod

Joystick

One controller easily governs a number of functions such as Playback, Exposure Lock, Exposure Compensation and more

Level and Grid Markers

Marker grid is overlaid in viewfinder, helping more professional composition

Manual Focus

Special override to automatic focus, allowing user to adjust camcorder focus manually using a touch panel or focus knob – very useful in a number of situations

Metering Modes

User can choose between such modes as Evaluative, Center-weighted, Average, and Spot depending on lighting situation

Motion JPEG Mode

A high-compression recording mode, often used to place video clips on the web or allowing them to be shared by e-mail

MPEG2 Engine

A form of video compression that renders fast, complex motions with exceptional precision

Multi-format capability

A feature built into some DVD camcorders, allowing recording and playing of DVD-RAM, DVD-RW, DVD-R DL, and DVD-R discs

NightShot Plus

Special infrared system allowing capture of natural-looking video when shooting in low light

On Screen Zoom

Additional Zoom and Record controls on the LCD frame permit more flexibility when holding the camcorder in odd positions

Picture Motion Browser

Software that allows user to easily browse, edit and manipulate still images and video recorded on camcorder or saved on computer

Program AE Mode

Artificial Intelligence Auto Focus

A computer-aided program that ensures sharp images even when subject is off-centre or in low light

Progressive Photo

Progressive scan approach that provides sharper detail in still photography in video

Scene Modes

Automatic, accurate exposure in a variety of situations such as Portrait, Sports, Night, Snow, Beach, Sunset

Image Effects

Series of options on rendering of images, such as Vivid, Neutral, Low-Sharpening, and Skin Detail

Pure Colour Engine

A special image processing circuit available on 3CCD HD camcorders, designed to improve picture quality

Quick Start

Allows camcorder to leap from stand-by to record mode in less than a second, helping ensure videographer does not miss a shot, and extending battery life

Remote Control

Camcorder can be operated remotely, for smoother shooting or to allow user to place himself in the picture

SD Memory Card Slot

Allows capture of photos and short movie clips directly to SD or SD HC card

Shock Proof

Feature designed to protect camcorder from damage after falling or knocking

Simultaneous Photo Recording

Permits capture of digital still photograph while recording video

Smooth Zoom Control

High-end feature has three pre-set zoom speeds to ensure professional, steady zoom shots

Soft Skin Mode

Detects skin tones and softens focus in that area of the picture; blemishes are reduced, while sharpness is maintained in other areas of the frame

Stereo Zoom Microphone

Camera-mounted microphone adjusts automatically according to lens zoom setting, bringing sound and images together

USB 2.0 Interface

Permits easy connection of hard disk camcorder to computer for fast transfer of footage

Water Resistance

Protects camcorder from rain or snow

Widescreen High Resolution Recording

Uses entire width of the image sensor to achieve true 16:9 widescreen "cinema" format without stretching the image