

# Comparison of Low-Cost Digital Video Recorders for Use in Early Care and Education and Early Intervention

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Edelman, L. (2009). *Comparison of low-cost digital video recorders for use in early care and education and early intervention*. Published by author, Denver, Colorado. For information contact [larry.edelman@ucdenver.edu](mailto:larry.edelman@ucdenver.edu)

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Which low-cost digital video recorders are best for use in early care and education and early intervention? There are a number of good choices. In this document I compare seven models. These are not the only choices. In fact, all of these brands offer more than one model. But these models are definitely in the ballpark. Please note that new brands and models appear very frequently and current models are updated or discontinued. I try to update this comparison periodically, so please send me any late-breaking news or experiences that you have.

Which model is best for you depends on what you ultimately want to do with the video and which features you want or need. Before reviewing the comparison tables, read this chart to help get an idea which features might be most important to you.

| Features to Consider           | Why they Matter   |
|--------------------------------|---|
| Format                         | Decide if you want/need SD (standard definition) or HD (high definition). HD has a better image but also has much larger file sizes.  |
| Video compression              | Find out what video format the camcorders record in and if that format suits your needs for your end product, editing, posting, and playing. Not all formats work equally well on PCs and Macs. Common formats include .avi, .mov, and mpeg-4.  |
| Record in different file sizes | Some camcorders just have one setting. Other camcorders let you choose between two or more sizes, so you can choose the largest size for viewing and smaller sizes for posting on the web, emailing, etc.   |
| Battery                        | Does the camcorder come with its own unique type of battery (these are usually rechargeable) or can you use batteries that can be readily purchased anywhere? Which do you prefer?  |
| Rechargeable battery           | Some camcorders use rechargeable batteries and some use disposable batteries. Each has its own advantages and disadvantages. Figure out what works best for you. If the batteries are rechargeable, find out how to recharge them, e.g. through an external charger or by plugging the camcorder into your computer. If you recharge by plugging the camcorder to a computer, you can't use the camcorder while the battery is charging. If the camcorder uses a rechargeable battery, you might want to buy a spare so that when your battery loses its charge you have another to replace it before you can get around to recharging. |
| Tripod port                    | You need this on the bottom of the camcorder so you can screw it into a tripod  |

| Features to Consider                | Why they Matter   |
|-------------------------------------|---|
| Zoom                                | Very important so you can capture the action without being obtrusive. Optical zoom is vastly desirable over digital zoom. The higher the optical zoom, the better.  |
| Storage                             | Amount of internal and external memory. All camcorders come with internal memory but not all have removable external memory cards. Having removable storage is a very important feature, especially if two or more people will be sharing the camcorder. I recommend that you purchase a camcorder that uses removable SD cards if it will be shared; that way, each user can have her/his own card. When the camera is transferred you can simply remove your card to avoid loss of video files. |
| Storage capacity                    | Storage capacity refers to how much video (measured in length of time) can be stored in the camcorder before needing to transfer the video files to another storage device. Camcorders that record in different file sizes will have variable storage capacity depending on the size of video recorded. Storage capacity varies according to color saturation and complexity of what you record.  |
| File size of one minute of video    | This is the size of one minute of video. File size matters for storage. It also might matter if you plan to email a file or upload it to a system that places size limitations. You can use software to compress the file to a smaller size, but that adds an additional step and also lessens the quality of the clip.   |
| Take still photos                   | Some camcorders have a dedicated still photo function while others don't. If you want to be able to take still photos, definitely choose a camcorder with a dedicated still photo function. With some you can capture a frame of video as a still.  |
| Manual lighting settings            | Also referred to as exposure controls. Some camcorders enable you to switch the lighting settings so that you will get better results in different situations, e.g. indoors, outdoors, etc. other camcorders just use one automatic setting that adjusts (theoretically) to various lighting conditions.  |
| Display monitor size                | This is the size of the LCD viewer  |
| Does display monitor rotate         | This indicates whether or not the display can be rotated so that the person being filmed can see themselves. This is a very important feature if you will be included in the action. By using this feature you can easily see if you are capturing what you want to capture. Without it, it's hit or miss.  |
| Come with editing software?         | Find out if the camcorder comes with its own editing software (this is not essential because there are plenty of free and low-cost software applications available). Almost all camcorders can download files to both Macs and PCs, but not all of the editing software that comes bundled with the camcorders works on both platforms.   |
| Minimum illumination for video clip | This tells you how well the camcorder will capture good video in dark settings. The lower the better.   |
| Accessories included                | This lists what come in the box. In addition, the camcorders come with some level of getting started guide and some come with detailed manuals. In addition to what comes in the box you can buy optional accessories.  |
| Price                               | Expect to pay between \$80 - \$200, plus shipping, tax, and optional accessories.   |

## The Camcorders That I Tested

| For Information from the Manufacturers  |  |
|---|--|
|    | <p><b>Sanyo Xacti VPC-CG9</b><br/> <a href="http://us.sanyo.com/Digital-Camcorders/VPC-CG9-Digital-Video-and-9MP-Photos">http://us.sanyo.com/Digital-Camcorders/VPC-CG9-Digital-Video-and-9MP-Photos</a><br/>           Amazon's price on 4/20/09: \$199.00</p>  |
|    | <p><b>Flip Ultra</b><br/> <a href="http://www.theflip.com/products.shtml">http://www.theflip.com/products.shtml</a><br/>           Amazon's price on 4/20/09: \$114.85<br/> <i>Note: On May 4, 2009, Pure Digital Technologies announced all new Flip Ultra &amp; UltraHD camcorders. These were not included in this version of this paper.</i></p> |
|   | <p><b>Flip Mino</b><br/> <a href="http://www.theflip.com/products.shtml">http://www.theflip.com/products.shtml</a><br/>           Amazon's price on 4/20/09: SD = \$151.47 HD = \$188.99</p>   |
|  | <p><b>KODAK Zi6 Pocket Video Camera</b><br/> <a href="http://www.kodak.com/eknec/PageQuerier.jhtml?pq-path=13063&amp;pq-locale=en_US&amp;requestid=647">http://www.kodak.com/eknec/PageQuerier.jhtml?pq-path=13063&amp;pq-locale=en_US&amp;requestid=647</a><br/>           Amazon's price on 4/20/09: \$149.99</p>                                  |
|  | <p><b>Aiptek MZ-DV</b><br/> <a href="http://www.aiptek.com">http://www.aiptek.com</a><br/>           Amazon's price on 4/20/09: \$119.99</p>   |
|  | <p><b>Creative Vado HD Pocket Video Cam</b><br/> <a href="http://us.creative.com/products/feature.asp?category=833">http://us.creative.com/products/feature.asp?category=833</a><br/>           Amazon's price on 4/20/09: \$219.99</p>  |
|  | <p><b>RCA EZ207 Small Wonder Digital Camcorder</b><br/> <a href="http://www.rcaaudiovideo.com/product.aspx?product=417">http://www.rcaaudiovideo.com/product.aspx?product=417</a><br/>           Amazon's price on 4/20/09: \$79.99</p>  |

## The Specs

| Specs  | Sanyo Xacti VPC-CG9  | Flip Ultra                       | Flip Mino                        | KODAK Zi6 HD   | Aiptek MZ-DV  | Creative Vado HD  | RCA EZ207  |
|--|--|----------------------------------|----------------------------------|--|---|---|--|
| Format   | SD   | SD                               | SD and HD models                 | SD and HD  | SD  | SD and HD   | SD   |
| Compression  | MPEG4 AVC/H.264  | Advanced Profile MPEG-4 AVI      | Advanced Profile MPEG-4 AVI      | H.264 (MOV)  | MPEG-4  | H.264 AVI   | NA   |
| Records in different sizes?                        | Y, 640 x 480 (60fps/6Mbps, 640 x 480 (30 fps, 3 Mbps.), 640 x 480 (30 fps, 2 Mbps), 320 x 240 (30 fps), 320 x 240 (15 fps) | N                                | N                                | Y, HD at 60 fps, HD at 30 fps, or VGA                  | Y, D1 (720x480, VGA (640x480), QVGA320x240              | Y, HD plus, HD, VGA resolution  | Y, Hi Quality or Web Quality   |
| Battery type                                       | 3.7-volt   | 2 AA                             | Internal Lithium-Ion             | (2) AA batteries                                       | Li-Ion Battery  | NA  | 2 AA   |
| Rechargeable battery?                              | Y. Comes with external charger   | N                                | Y, via USB                       | Y. Comes with external charger                         | Y, via AC or USB  | Y, via USB  | N  |
| Video Recording Time between charges               | Approx. 70 min   | Up to 2 hrs                      | Up to 4 hrs                      | NA   | About 100 min, in VGA mode                              | Up to 2 hrs   | NA   |
| Tripod Port  | Y  | Y                                | Y                                | Y  | Y   | Y   | Y  |
| Zoom   | 5x optical, 12x Digital  | 2x digital                       | 2x digital                       | 2X digital   | 3x Optical 8x Digital                                   | 2x Digital Zoom   | 3x Optical   |
| Storage  | Internal: 40 MB<br>External: SDHC Memory Card up to 32GB   | Internal: 2 GB<br>External: none | Internal: 2 GB<br>External: none | Internal: 128 MB<br>External: SD/SDHC card up to 32 GB | Internal: 40 MB<br>External: SD Memory Card, up to 32GB | Internal: 8GB<br>External: none   | Internal: 256 MB<br>External: SDHC Memory Card up to 8GB                                     |
| Storage capacity (as reported by the manufacturer) | 4 hours of video with a 4GB SDHC memory card, over 2 hours with a 2GB standard SD card, or over one hour                   | 1 hour with fixed 2 GB           | 1 hour with fixed 2 GB           | NA   | 80 min. of video with a 1 GB SDMMC card                 | Up to: 2 hours (HD+ quality), 4 hours (HD quality), 8 hours (VGA quality) | up to 4 hours in High Quality, or 8 hours in Web Quality <sup>1</sup> with optional 8GB card |

| Specs  | Sanyo Xacti VPC-CG9   | Flip Ultra                                       | Flip Mino                                | KODAK Zi6 HD  | Aiptek MZ-DV  | Creative Vado HD  | RCA EZ207  |
|--|---|--|--|---|---|---|--|
|  | with a 1GB standard SD card   |  |  |   |   |   |  |
| Take still photos  | Y, 9 MP   | N, Can capture still photos from video           | N, , Can capture still photos from video | Y, 3 MP   | Y, up to 8 MP   | Y   | Y  |
| Manual lighting settings                                   | Y   | N  | N  | N   | Y   | N   | N  |
| Display monitor size                                       | 2.5 "   | 1.5 "  | 1.5 "                                    | 2.4 "   | 2.4"  | 2"  | 1.5"   |
| Does display monitor rotate?                               | Y   | N  | N  | N   | Y   | N   | Y  |
| Come with editing software?                                | Y   | Y  | Y  | Y, PC only  | Y   | Y, PC only  | N  |
| Minimum illumination for video clip (the lower the better) | 4 lux (TV-SHQ High Sensitivity mode or Lamp mode, 1/15 sec.), approx. 15 lux (TV-SHQ Auto mode, 1/30 sec) | >2.0V/lux  | >2.0V/lux                                | NA  | NA  | NA  | NA   |
| Accessories included                                       | USB Cable, AV Cable, Battery Charger, Lens Cap, Li-ion Battery  | Soft Case, TV cable, wrist strap, 2 AA batteries | Soft Case, TV cable, wrist strap         | 2 AA Ni-MH batteries, Battery charger, HD & AV cables, Wrist strap, Camera pouch, edit Software | USB Cable, AV Cable, Battery Charger, Battery, ear buds | HDMI Cable, USB Extension Cable, Silicon Skin, Rechargeable Battery | AV Cable, Wrist Strap, USB Cable, 2 AA Batteries |

## File Formats, Sizes, and Media Players for PCs and Macs

| Specs                                      | Sanyo Xacti VPC-CG9 | Flip Ultra   | Flip Mino  | KODAK Zi6 HD                             | Aiptek MZ-DV   | Creative Vado HD   | RCA EZ207     |
|--|---------------------|--|--|--|--|--|---------------|
| File type when downloaded on a PC          | .MP4 (MPEG-4 Movie) | .avi ( <i>Audio Video Interleave</i> , the file format for Microsoft's Video for Windows standard) | .avi ( <i>Audio Video Interleave</i> , the file format for Microsoft's Video for Windows standard) | .mov (Apple QuickTime Movie file format) | .asf ( <i>Advanced Streaming Format</i> , a streaming multimedia file format developed by Microsoft) | .avi ( <i>Audio Video Interleave</i> , the file format for Microsoft's Video for Windows standard) | .avi          |
| File size of one minute of video on a PC   | TVHR<br>45.1 MB     | 12 MB  | 13.2 MB  | HD60<br>88.2 MB                          | D1<br>22.1 MB  | HD+<br>62.1 MB   | WQ<br>19.1 MB |
|  | TVSHQ<br>21.1 MB    |  |  | HD<br>66.9 MB                            | VGA<br>20.7 MB   | HD<br>31.7 MB  | HQ<br>37.7 MB |
|  | TVHQ<br>15.9 MB     |  |  | VGA<br>15.8 MB                           | QVGA<br>3.6 MB   | VGA<br>16.1  |               |
|  | Web SHQ<br>5.9 MB   |  |  |  |  |  |               |
|  | Web HQ<br>4 MB      |  |  |  |  |  |               |
| Media players that can play files on a PC  | VLC, QT             | WMP, QT (with Flip plug-in)  | WMP, QT (with Flip plug-in)  | VLC, QT                                  | VLC, WMP   | WMP  | VLC, QT, WMP  |
| File size of one minute of video on a Mac  | TVHR<br>44 MB       | 11.8 MB  | 13 MB  | HD60<br>86.2 MB                          | D1<br>21.6 MB  | HD+<br>60.7 MB   | WQ<br>18.7 MB |
|  | TVSHQ<br>20.7 MB    |  |  | HD<br>65.3 MB                            | VGA<br>20.2 MB   | HD<br>31 MB  | HQ<br>36.8 MB |
|  | TVHQ<br>15.6 MB     |  |  | VGA<br>15.5 MB                           | QVGA<br>3.5 MB   | VGA<br>15.7 MB   |               |
|  | Web SHQ<br>5.8 MB   |  |  |  |  |  |               |
|  | Web HQ<br>4 MB      |  |  |  |  |  |               |
| Media players that can play files on a Mac | <b>QT, VLC</b>      | QT with Flip for Mac, VLC  | QT with Flip for Mac, VLC  | QT, VLC                                  | <b>VLC</b>   | QT, VLC  | VLC, QT       |

## Extra accessories to consider purchasing:

- small padded carrying case
- extra batteries
- extra SD cards (if the camcorder uses removable media),
- battery charger (if the camera can accommodate rechargeable batteries)
- a small flexible leg tripod (do not purchase the Flip tripod as it is less flexible and way overpriced. In September, 2009, the Sunpak 620-786 Mini-Spider Tripod was available at Amazon.com for only \$1.25:

[http://www.amazon.com/SunPak-620-786-Sunpak-Mini-Spider-Tripod/dp/B00009W3TY/ref=dp\\_cp\\_ob\\_e\\_title\\_3?ie=UTF8&qid=1253125882&sr=8-1](http://www.amazon.com/SunPak-620-786-Sunpak-Mini-Spider-Tripod/dp/B00009W3TY/ref=dp_cp_ob_e_title_3?ie=UTF8&qid=1253125882&sr=8-1)

## My recommendation (at least for today)

There are many fine choices described in this comparison. But if I were forced to recommend one low-cost digital video recorder for broad uses in early care and education and early intervention, I recommend the Sanyo Xacti CG9, hands-down. Why? Because it has ALL of the key features that I think are essential and it is the only camcorder that I have tested that has ALL of these features. The only downside is that it is also the most expensive of the bunch. But you get what you pay for and it still comes in under \$200.

- 1) It uses a removable SD card.
- 2) It has the largest display monitor of all of the camcorders that I tested, plus it rotates.
- 3) It records in 5 different file sizes.
- 4) It has 5x optical zoom, the highest of all of the camcorders that I tested.
- 5) It produces good quality audio and video.
- 6) Mpeg-4 is a great video format and AVC/H.264 is a great compression.
- 7) It has a dedicated still photo function.
- 8) Decent battery life and uses rechargeable batteries that are recharged using an external charger, so you can use the camcorder while charging a spare battery.
- 9) It has manual lighting settings.
- 10) You can edit video right in the camcorder.
- 11) Works well with PCs and Macs.

In addition...some providers like to make a camcorder available for children to use and some providers lend camcorders to families. For these two purposes, one of the simpler, less expensive (and less feature-rich) camcorders might be a good choice, including the Flip and RCA lines.

## If you want REALLY good audio in a small, inexpensive digital camcorder, keep your eye out for...

**Zoom Q3 - Handy Video Recorder** – This camcorder is supposed to be available in September, 2009, but as of today, is not yet available. This is absolutely bound to have the best sound out of all camcorders in its class. It has the same audio prowess of Zoom's state-of-the-art H2 and H4 digital audio recorders and the video specs look good, too:

<http://www.samsontech.com/products/productpage.cfm?prodID=2020&brandID=4>

## Other camcorders in this class that I have not reviewed:

- Polaroid CAA-03040S Camcorder - 3.0 MP – I'm not overly optimistic about this one from the reviews, specs, and pricing.
- Sony Webbies (MHS-PM1 and MHS-CM1) - I'm not overly optimistic about this one from the reviews, specs, and pricing.

## Please Note:

This article only reviews a handful of camcorders in low-cost, point and shoot, drag and drop files class. If you want higher quality video you may very well want to move up to the next class of camcorders. A very good guide for purchasing camcorders based on class of equipment and cost can be found at:

<http://reviews.cnet.com/camcorder-buying-guide/>