



Chapter Eleven: Audio, MIDI, and Video Technologies



Audio

Audio Formats for Computers - These audio files are generally played through the same programs used for video.

You will want to be familiar with these formats, even if you don't choose to develop skills in creating or using audio and MIDI for your own use. These formats are becoming more common on websites, both as downloads and as a part of multimedia authoring..

- Quicktime mov. - Quicktime Movie from the Apple for video and audio - qt, .aif, .aifc, .aiff, .mov
- Windows Media Formats - .avi, .asf, .asx, .rmi, .wav, .wma, .wax
- Musical Instrument Digital Interface (MIDI) - .mid, .rmi
- Real Audio or video - .ra, .ram, .rmm, .mp3, plus other file formats
- MPEG - Moving Picture Experts Group - currently gaining in popularity due to smaller file size without losing quality (mpg, .mpeg, .m1v, .mp2, .mp3, .mpa, .mpe)
- UNIX formats - .au, .snd
- MP3 Files - .mp3



Guides

- Adobe Guide - <http://www.adobe.com/support/techguides/webpublishing/audio/page3.html>
- Computer Resource Center at Harmony Central - <http://www.harmony-central.com/Computer/>

For those of you interested, here's a site by Steven E. Schoenherr recapping recording technology history. His digital revolution section goes from the first 5 inch CDs to the Apple's iPod (<http://history.acusd.edu/gen/recording/ipod.html>). Considering that the CD -Rom technology is fairly new and already almost obsolete, it's important to stay familiar with the latest developing technologies since these innovations happen very rapidly!

- <http://history.acusd.edu/gen/recording/notes.html>.

- <http://history.acusd.edu/gen/recording/digitalrev.html>

1985 - Sony and Philips produced the standard for Compact Disc Read Only Memory (CD-ROM) computer discs that would use the same laser technology as the audio CD.

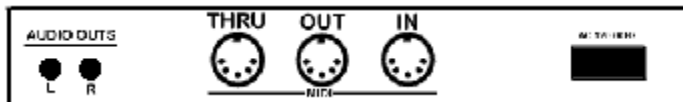
1996 - DVD players started selling in Japan, and began in 1997 selling in the U.S.

1997 - MP3.com was founded in November by Michael Robertson

For more in-depth understanding of digital audio formats you can use on your computer try these sites (optional):

- The Recording Studio from Musiq.com - Intelligence in Music - Digital Audio - <http://www.musiq.com/recording/digaudio/index.html>
- MP3 - <http://www.musiq.com/recording/mp3/index.html>
- MP3.com - <http://www.mp3.com/>
 - Hardware Guide - <http://software.mp3.com/hardware/guide/index.html>
 - Software Guide - <http://software.mp3.com/software/guide/>

MIDI - Musical Instrument Digital Interface



The Musical Instrument Digital Interface, or MIDI standard was originally developed by Japanese musical instrument companies. "In 1983, Sequential Circuits from the U.S. and Roland from Japan introduced the first keyboards with MIDI, soon followed by virtually every other synthesizer company in the world. Within three years after MIDI's introduction, almost no electronic instrument was made in the world that didn't have a MIDI plug on it. It became a true universal standard. To this day there is no competition to MIDI for connecting all types of electronic musical instruments together or for creating personal musical systems. Like computers, MIDI is used by millions of people for thousands of applications. It's also being used in fields other than just music, such as theatrical lighting, computer games, and recording studio automation." (MIDI History - <http://www.mtsu.edu/~dsmitche/rim419/midi/HTMLs/MIDHIS~1.HTM>)

What is MIDI? "MIDI is an 'electronic language', a digital language consisting of "bytes" just like the data in files that you have on your computer, which electronic instruments use to control each other. MIDI is itself a protocol for transferring information, mostly about music. This information takes the form of electronic signals that the instruments pass between each other."

"MIDI uses a single wire in the cable to send information, the musical data that MIDI sends travels in only one direction over a single cable. However, MIDI was devised to allow

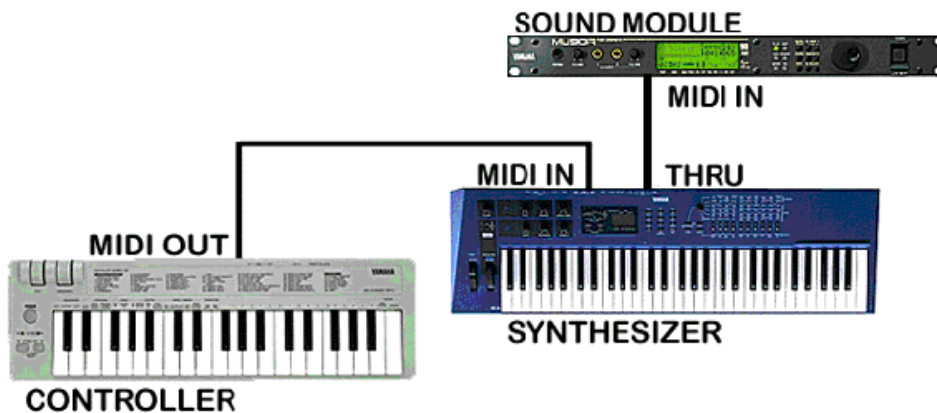
information to go both directions between two instruments, by simply using two cables. At the same time, MIDI can also pass data on to a third, fourth, fifth instrument, or as many synthesizers as you can afford. To accomplish this, it was decided to have three different MIDI connectors on each instrument:

- One to receive data IN.
- One to send the data OUT.
- One to pass incoming data on THROUGH (spelled "THRU") to another MIDI instrument."

(Taken from
(<http://www.mtsu.edu/~dsmitcherim419/midi/HTMLs/MIDIIN~1.HTM#anchor%20whatmid>))

OPTIONAL WEBSITES on MIDI

- Introduction to MIDI - <http://www.mtsu.edu/~dsmitcherim419/midi/HTMLs/Contents.html>
- The MIDI Farm - <http://www.midifarm.com/>
- MIDI Industry Standard - <http://www.midifarm.com/industry/>



Free Music Files on the Web

Downloadable MIDI and Audio Files

- Standard MIDI files on the NET - <http://www.manythings.org/midi/>
- Classical MIDI Archives - <http://www.classicalarchives.com/>

- Classical Guitar Music - <http://home.att.net/~jorgeguillen/>
- mFiles - free classical sound waves and MP3s - <http://www.mfiles.co.uk/classical-music.htm>
- MP3 Downloads - <http://www.mfiles.co.uk/mp3-files.htm>
- MIDI Downloads - <http://www.mfiles.co.uk/midi-files.htm>
- Free Classical Downloads from Germany - <http://www.kunstderfuge.com/>
- Classical Music Symposium - <http://members.tripod.com/MrMaestro/>
- Harmony Central - <http://www.harmony-central.com/MIDI/files.html>
- Folk Songs from Various Countries - <http://ingeb.org/folksong.html>
- MIDI Farm - <http://files.midifarm.com/files/>
- Primary School Folk Songs - <http://168.99.13.13/schools/Opstad/Songs/Primary.htm>
- KrazyKats - MIDI Links - http://www.krazykats-karaoke.co.uk/midi_sites.html
- Children's Songs - MIDI - <http://www.theteachersguide.com/ChildrensSongs.htm>
- Children's Music and Songs - <http://falcon.jmu.edu/~ramseyil/songs.htm>
- Children's Music Web - <http://www.childrensmusic.org/>
- Kids Music Web - <http://www.kidsmusicweb.com/>
- Children's Music Network - <http://www.kidsmusicweb.com/>
- Laura's MIDI Heaven - <http://www.laurasmidiheaven.com/Kids.shtml> - Including Kids Songs, Patriotic Songs, Songs from the 50 States <http://laurasmidiheaven.com/statesongs-N.shtml>
- Public Domain Music - <http://www.pdmusic.org/>
- Songs for Teaching - <http://www.songsforteaching.com/>
- Using Music to Teach Social Studies - <http://www.songsforteaching.com/SocialStudies.html>
- Multicultural Music - <http://www.songsforteaching.com/Diversity.html>
- Folksongs - <http://www.songsforteaching.com/Folk.html>
- American Presidents - <http://www.songsforteaching.com/USPresidents.html>

KIDiddles - <http://kididdles.com/museum/index.html>

- Traditional Songs - <http://kididdles.com/museum/traditional.html>
- Songs from Around the World - <http://kididdles.com/museum/world.html>

NIEHS KIDS' PAGES

NIEHS Kids' Pages - <http://www.niehs.nih.gov/kids/music.htm>

- Patriotic Songs - <http://www.niehs.nih.gov/kids/musicpatriot.htm>
- Index - <http://www.niehs.nih.gov/kids/home.htm>

Kids Websites with MIDI and Audio Files

- MENC - Song Samples from Sing America! - <http://www.menc.org/guides/patriotic/listentracks.html>

- Karen's Karaoke Kids' Songs - <http://arose4ever.com/karen/karaoke/kids.htm> Check by category for Americana and Folk Songs - MIDI files - http://arose4ever.com/karen/karaoke/amer_folk.htm
 - Laura's MIDI Heaven - <http://www.laurasmidiheaven.com/Kids.shtml> - Including Kids Songs, Patriotic Songs, Songs from the 50 States <http://laurasmidiheaven.com/statesongs-N.shtml>
 - Primary School Folk Songs - <http://168.99.13.13/schools/Opstad/Songs/Primary.htm>
 - KrazyKats - MIDI Links - http://www.krazykats-karaoke.co.uk/midi_sites.html
 - Children's Songs - MIDI - <http://www.theteachersguide.com/ChildrensSongs.htm>
 - Children's Music and Songs - <http://falcon.jmu.edu/~ramseyil/songs.htm>
 - Children's Music Web - <http://www.childrensmusic.org/>
 - Kids Music Web - <http://www.kidsmusicweb.com/>
 - Children's Music Network - <http://www.kidsmusicweb.com/>
 - Public Domain Music - <http://www.pdmusic.org/>
 - Songs for Teaching - <http://www.songsforteaching.com/>
 - Folk Songs from Various Countries - <http://ingeb.org/folksong.html>
 - Music for Kids Online - <http://www.music4kidsonline.com/>
 - Judy and David's Online Songbook - <http://judyanddavid.com/Songbook/Songbookcover.html>
 - Just for Kids - http://www.stuffucanuse.com/Kelly/kids_links_music.html
 - Little Kids Rock - <http://www.littlekidsrock.org/index.html>
 - Sesame Street Music - <http://www.sesameworkshop.com/sesamestreet/music/>
 - Music Zone - Sesame Street - <http://www.sesameworkshop.com/sesamestreet/music/zone/>
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Music Organizations

- The Society for American Music - <http://www.american-music.org/>
 - American Music on the Web - <http://www.american-music.org/resources/ResourcesOnWeb.htm>
 - American Music Resource - <http://www.uncg.edu/mus/courses/flmccart/amr/>
 - Latin American Music Center - <http://www.music.indiana.edu/som/lamc/>
 - The American Musical Instrument Society - <http://www.amis.org/>
 - American Music Theatre - <http://www.americanmusictheatre.com/>
 - Audio Interviews on American Music from NPR - <http://www.npr.org/programs/specials/vote/list100.html>
 - Music in Latin America - <http://lanic.utexas.edu/la/region/music/>
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Worldwide Web Music Resources - http://www.music.indiana.edu/music_resources/

- The World Music Network - <http://www.worldmusic.net/>
- World Music Listen - <http://www.worldmusic.net/listen/index.html> (Includes NPR interviews)
- Roots World - Listening to the Planet - <http://www.rootsworld.com/rw/>
 - Asia on Roots World - <http://www.rootsworld.com/rw/asia.html>

- World Music Institute - <http://www.heartheworld.org/index.asp> Links Online - <http://www.heartheworld.org/Links/index.html>
- World Music Central - <http://www.worldmusiccentral.org/> Online Media - <http://www.worldmusiccentral.org/staticpages/index.php/onlinepublications.htm>
- International Music Archives - <http://www.eyeneer.com/World/>
- Putumayo World Music - <http://www.putumayo.com/>
- Roots Music Canada - <http://www.rootsmusiccanada.com/main.cfm>
- Multicultural Songbooks for Music Around the World - <http://www.songsforteaching.com/SongBooksMulticultural.html>
- Calabash World Music - <http://www.calabashmusic.com/>
- Global Music Center - <http://www.globalmusic.fi/> in English - http://www.globalmusic.fi/in_english/index.html
- Aboriginal Music - <http://www.manikay.com/>
- Traditional Mexican Music - <http://www.northcoast.com/~spdtom/books/mexmusic.html>
- African Music and Dance - <http://www.cnmat.berkeley.edu/~ladzekpo/>
- Classical Music of Persia - <http://www.duke.edu/~azomorod/persian2.html>
- Israeli Music on the Web - <http://www.radiohazak.com/>
- The Global Schoolhouse - <http://www.globalschoolhouse.com/>
- History of the World Timeline - <http://www.historychannel.com/perl/timeline.pl?year=500BC>

World Music MIDI Files

- Mexican MIDI files - <http://www.ifccsa.org/menumidi.html>
- Laura's MIDI Heaven World Music - <http://laurasmidiheaven.com/International/WorldMusic.shtml>
 - [Mexican](#) MIDI files
 - [Jewish](#) MIDI Files
 - [International](#) Anthems
- Mama Lisa's World - Songs and Rhymes from Around the World - <http://www.mamalisa.com/world/>
- Muslim Chanting Islamic City - <http://www.islamicity.com/multimedia/radio/ch100/>
- The Words and their Stories - <http://www.ecwa.asn.au/info/lyrics.html>
- Cops R Us - Anthems and Flags from Around the World - <http://www.copsrus.com/anthems.html>
- The Ultimate International MIDI Page - <http://www.ultimatemidi.com/midi4.html>
- 200 International MIDI Links - <http://ingeb.org/midimidi.html>



Digital Video and Audio Players for Your Computer

Video and audio technologies are becoming more common on the web and will become more popular as faster network and internet connections are developed. CD Writers and DVD Burners are now commonly available to the consumer. These technologies are multiplying constantly and what is available at this writing will no doubt become obsolete. Apple has made video very accessible to all age groups through [iMovie](#) and [Quicktime](#) standard installations on all MACs. Other companies such as [Pinnacle Systems](#), [Ulead](#), and [Avid Technologies](#) for PC have included software and hardware video and audio capture options on the latest computers for many years. Faster firewire connections are becoming standard on new computers. Older video cards including capture options (such as ATI's All-in-Wonder multimedia graphics solutions) were made affordable and are now also readily available to the consumer.

Typical video and audio formats:

- Quicktime mov. - Quicktime Movie from the Apple for video and audio - qt, .aif, .aifc, .aiff, .mov
- Windows Media Formats - .avi, .asf, .asx, .rmi, .wav, .wma, .wax
- Musical Instrument Digital Interface (MIDI) - .mid, .rmi
- Real Audio or video - .ra, .ram, .rmm, .mp3, plus other file formats
- MPEG - Moving Picture Experts Group - currently gaining in popularity due to smaller file size without losing quality (mpg, .mpeg, .m1v, .mp2, .mp3, .mpa, .mpe)
- UNIX formats - .au, .snd
- MP3 Files - .mp3



Quicktime - <http://www.apple.com/quicktime/>



Real One Video Player - <http://www.real.com/>



Windows Media Player -

<http://www.microsoft.com/windows/windowsmedia/download/default.asp>



Multimedia Resources for the Web

- Macromedia Flash and Shockwave players are needed for web multimedia content.
 - Macromedia Software - <http://www.macromedia.com/>
 - Demo software downloads - <http://www.macromedia.com/software/>
 - Shockwave - <http://sdc.shockwave.com/>
 - Flash Player - <http://www.macromedia.com/software/flashplayer/>
 - E-Learning for Educators - <http://www.macromedia.com/desdev/education/>
- Streaming Media World: <http://www.streamingmediaworld.com/>

Real Audio Sound, Video, and Full Text News

- The PBS website includes many Flash web multimedia presentations, timelines, photographs, etc.
 - PBS Online News Hour - <http://www.pbs.org/newshour/>
 - Real Audio Sound and Video plus full text of news items - <http://www.pbs.org/>
- BBC News - Audio and Video - <http://news.bbc.co.uk/>



Industry Standards - Technical Background

MPEG Video Format - Current popular video format with compression allowing for smaller file size.

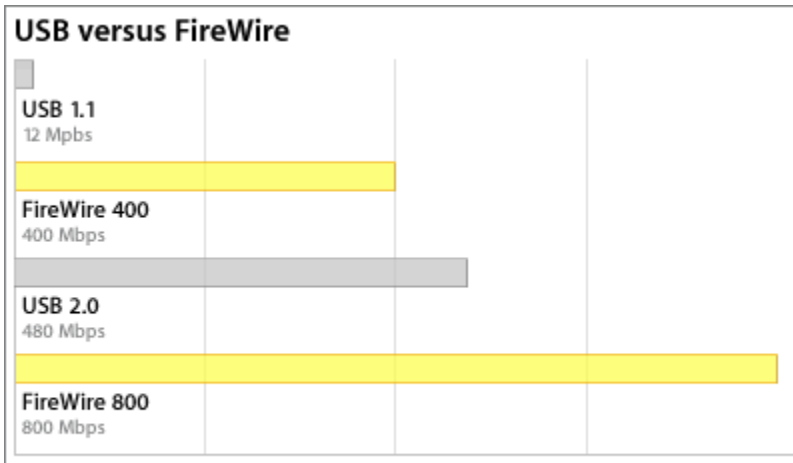


Moving Picture Experts Group - <http://mpeg.telecomitalia.com/>

"The term MPEG also refers to the family of digital video compression standards and file formats developed by the group. MPEG generally produces better-quality video than competing formats, such as Video for Windows, Indeo and QuickTime. MPEG files can be decoded by special hardware or by software. MPEG achieves high compression rate by storing only the changes from one frame to another, instead of each entire frame. The video information is then encoded....some data is removed. But the diminishment of data is generally imperceptible to the human eye." (MPEG Information - <http://80211-planet.webopedia.com/TERM/M/MPEG.html>)



FireWire® and i.LINK® (IEEE 1394) Technology



Due to the speed and efficiencies of FireWire 800, in many cases the effective bandwidth is more than twice that of USB 2.0.

What is 1394?

From TechTalk from the 1394 Trade Association - <http://www.1394ta.org/Technology/About/TechTalk.htm>

"1394 was designed to be a universal interconnect, eliminating the need for many different input/output connectors. The resulting port integration and consolidation of circuit board space results in an overall reduction in product cost and complexity. The 1394 bus is a versatile, high-

speed and inexpensive method of interconnecting a variety of consumer electronics devices and personal computers, while eliminating the frustrating tangle of cables most users encounter today."

IEEE - Institute of Electrical and Electronics Engineers

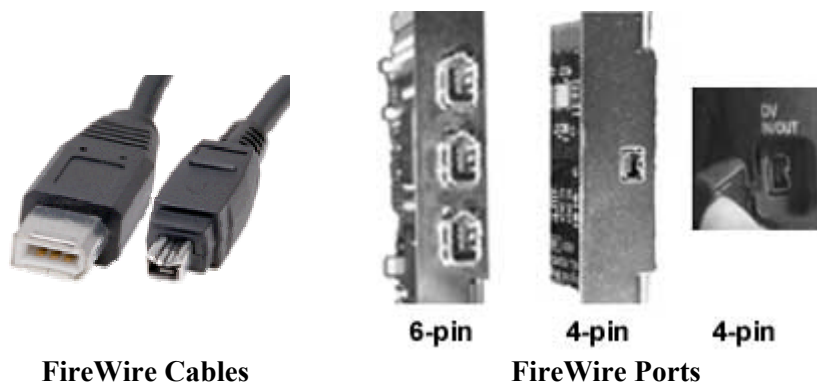
"IEEE is the world's largest technical professional society, based in the USA. Founded in 1884 by a handful of practitioners of the new electrical engineering discipline, today's Institute has more than 320,000 members who participate in its activities in 147 countries. The IEEE sponsors technical conferences, symposia and local meetings worldwide, publishes nearly 25% of the world's technical papers in electrical, electronics, and computer engineering and computer science, provides educational programs for its members and promotes standardization. Areas covered include aerospace, computers and communications, biomedical technology, electric power and consumer electronics."

Background Information on FireWire

MORE TECH TALK from PCWorld Article:

<http://www.pcworld.com/howto/article/0%2Caid%2C104826%2C00.asp>

"Before FireWire and USB appeared, external devices were typically connected to a computer using serial and parallel ports. But those connections had many limitations: data transfer rates were sluggish, devices couldn't be unplugged without causing your computer to crash, you couldn't easily swap multiple devices on the same port, and so on. In the mid nineties, the connectivity situation began to improve dramatically with the introduction of FireWire and, a few years later, USB. Both technologies offer faster data transfer rates, true plug-and-play connectivity, the ability to unplug one device and plug another into the same port without rebooting, and more. FireWire, or IEEE 1394. A serial input/output technology invented by Apple Computer, FireWire can transfer data up to 400 megabits per second. FireWire connections are offered today in many notebooks, digital camcorders, and digital cameras, and some external hard drives, CD writers, and other devices."



FireWire Cables

FireWire Ports

Analog vs. Digital Video Technology

Video is a wonderful tool for classroom instruction and student assessment. Unfortunately, most teachers do not have access to the state-of-the-art digital video cameras and digital editing software. An exception might be those of you fortunate enough to have latest Macintosh computers with built in FireWire and USB connections along with iMovie software which is included in Macintosh computer packages. Those options allow you to create amazingly professional digital video on your desktop computer. Digital video is becoming more accessible and affordable, and as the television standard is moving toward digital TVs, the analog systems will be antiquated. But - that may be all you have in your classroom at this time - so I suggest you USE IT! You can also find some inexpensive video capture solutions at your local computer store.



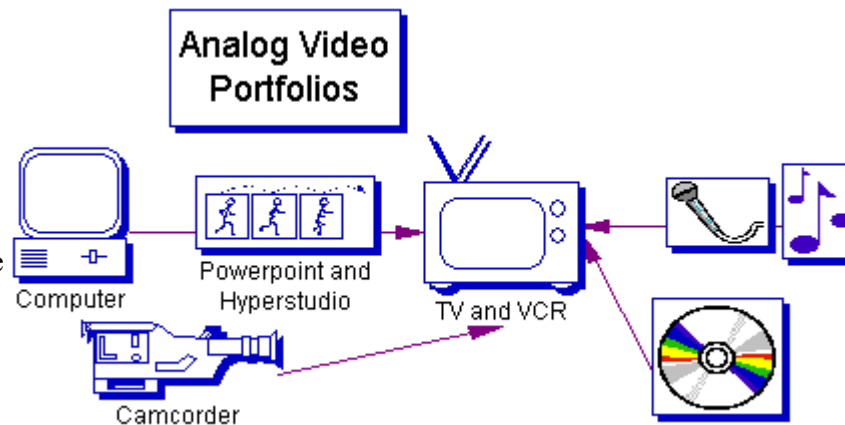
Professor's Note

My own experiences with video come from the old days of strictly analog camcorders, VCRs, TVs, and digital to analog TV converters which allowed me to take anything viewed on the computer to the VCR. Although those technologies are out of date, I feel they are still very valuable for teachers. I call this "the poor man's video." My Title I students created video portfolios on VCR tapes I purchased at the beginning of the year. They made Powerpoint intros, selected their favorite music for their soundtracks, recorded personal introductions in English and Spanish, read poetry, and saved all their Hyperstudio stacks to video from the computer. They were able to continue "filming" throughout the year, including visits by their families at open house, special classroom events and concerts, as well as taking close-ups of projects they completed in class. This was all done in a corner of my classroom - all set up with a computer, interface to VCR, VCR, TV screen, and CD/Cassette tape recorder with cables to the audio in of the VCR.



Analog Video

Of course, if I were in the classroom today, I'd be doing everything I could to go digital with video! But sometimes you have to make do with the tools you have! Your students can still benefit from older technologies.



How do I connect my computer to the camcorder or VCR?

<http://www.ramelectronics.net/html/howto-pc-vcr.html>



Famous Brandnames - ViewSonic, StarTech, AverKey, etc.



Terminology

- Video Terminology - <http://www.ulead.com/learning/video1/page1.htm>
- Video Terms and Formats - <http://www.mpa-garching.mpg.de/MPA-GRAPHICS/vid-glossary.html>
- Status of Digital Television - FCC - <http://www.fcc.gov/cgb/consumerfacts/digitaltv.html>
- Analog or Digital - What's the difference? - <http://telecom.hellodirect.com/docs/Tutorials/AnalogVsDigital.1.051501.asp>



Camcorders

Camcorders - <http://www.internetvideomag.com/camera-reviews.htm>

What Kind of Camcorder should I buy?

<http://www.internetvideomag.com/WhatDoYouNeedtoShootVideo.htm>