



# The Language of **WIDE**

Volume 1

**TERMS  
DEFINITIONS  
and JARGON**  
Explained in Everyday English  
by Dany Byrne



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# The Language of Video

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As you begin to make and edit videos, you'll run up against some uncommon words used to describe common practices; some common words used to describe uncommon practices; and some just plain indecipherable jargon. This can leave you feeling confused and discouraged – but take heart. No one should avoid video because it *sounds* hard. It isn't! Let's demystify the process by defining the terms. Once the jargon is out of the way, video becomes a much friendlier medium.

Unlike film, video uses a multitude of formats, speeds, compression rates, and even pixel dimensions which vary with both the broadcaster and the receiver. This ebook will not go into detail about formats. We are going to concentrate, instead, on the nuts and bolts that all the formats share.

But to avoid confusion at the outset, these are most common video formats used on the internet: AVI, QuickTime (or MOV), MPEG, Window Media (or WMV), and Flash. The three letter extension at the end of a video file name identifies the format. When you make your video, you will produce it (in video-speak, this is called “rendering”) in one of these formats. Within the format, regardless of which one you choose, you'll have to make decisions about the Codec, the Bit Rate, the Frame Rate, etc.

*The Tower of Video Babel*, another ebook in this series, will discuss which formats are best suited to which job. We'll look at why there are so many formats as well as their strengths and weaknesses. This book, however, is going to explore the mysterious terms videographers throw around and discover how the processes they describe can make our videos stand out from the crowd.



**Codec** is a contraction of **co**mpress/**de**compress

Video files are very large. A 30 minute DVD quality file with CD quality audio can easily grow to over 2 GB in size. This is clearly much too large a file to be streamed over the internet, even with a broadband connection. So the file needs to be compressed for transmission and then decompressed for playback.

There are a dizzying number of codecs, each with partisans who say this one is the best of all. Indeed, some codecs *are* better for certain jobs than others.

But here's the rub. A video is created using a specific codec. If you want to share the video with others, they need to have that same codec on their computers to decompress it. Lack of a particular codec or having an outdated version of a codec leads to error messages and munged videos. It's a source of frustration for many, producers and viewers alike. Because of this, if you plan to make your video available over the web, it is a good idea to *encode it with a widely available, commonly installed codec*. Windows Media codecs - which are supplied with Windows Media Player, QuickTime codecs, and DivX are all good choices.



Which one is right for you video? Experiment! If you like the way your video looks, you've probably found the right codec.



The speed with which data is transmitted is measured in bits, and is known as the bit rate. This general concept is used to define a video's bit rate. In general, the higher the bit rate, the higher the quality.

A **video's bit rate** is determined by dividing the size of the video file (in KB) by the length (in seconds) of the video. A 100 MB video that lasts 1 minute would have a bit rate of 1706 kps. (100 MB = 104,200 KB. 1 minute has 60 seconds. Divide 104,200 by 60 to get the bit rate.) The larger the file and shorter the duration – the higher the bit rate. As a general rule, on the internet, a video should not have a bit rate higher than 1500kps – any higher is likely to overwhelm the receiving computer. Most video rendering programs will give you the option to constrain the bit rate. When you have the choice, choose a number between 1,000 and 1,500 kps, then let the software take care of the math.



Video can be encoded in two ways - with a constant bit rate (CBR) or with a variable bit rate (VBR).

**Constant Bit Rate** is normally used for streaming video (for instance, You Tube) where it is important to control both the size of the file and the amount of data that is transmitted. With a Constant Bit Rate, a consistent amount of data is downloaded to a user's computer, and the video is less likely to start and stop as the computer tries to catch up with the information it is receiving.

**Variable Bit Rate** is used where quality, rather than file size, is the main concern, and where unpredictable transmission speeds will not be an issue. A DVD movie is usually encoded at a Variable Bit Rate.

You can further affect quality by having **One Pass** or **Two Pass** encoding. In one pass encoding, the software tries to predict what comes next as it analyzes the data, and the content is encoded immediately. In two pass encoding, the content is analyzed during the first pass, then encoded during the second pass. The quality of two pass encoding is higher, but the time required to encode a clip is doubled.

As you can see, in theory the best quality videos will be achieved with two pass, variable bit rate encoding. However, the time required to make the video (which can be literally all night) and the size of the file may make such encoding impractical. In addition, when a video with a very high bit rate is streamed over the web, a slow connection speed or an inadequate video card or memory in the viewer's computer can make the video appear jerky as the computer struggles to keep up with the amount of data coming in.

Everyone hates watching videos that randomly start and stop during playback. So - with current technology - when you make a video for You Tube, it is usually best to encode it using single pass, constant bit rate, even though it may mean sacrificing a bit of quality.

**framerate**

As you probably know, the speed with which 35 mm movie film passes through the camera's gate is measured in Frames Per Second. With film, this is a literal measurement. Every properly calibrated movie camera and projector runs the film

at 24 frames per second, so any movie can be played on any projector. As long as the equipment is in good working order, the movie should look just as the director intended.

With video, it's a little more complicated. There are no static "frames," so measurements in "frames per second" is a convention, not a literal fact. Instead, pixels are "drawn" on the screen in horizontal lines at a very high rate. A "frame" is usually understood to mean a full screen's worth of data. TV screens, computer monitors, flat panel displays, and HDTV all use different methods to illuminate the pixels, and they all have different frame rates.



For professional television, the standard is 30 Frames Per Second. For a Quick-time video, the frame rate is more likely to be 15 Frames Per Second.

Who cares? Why should you, as an online entrepreneur, care?

Frame rate will directly determine how smoothly your video plays. A high frame rate produces a high quality, easy to watch, professional looking video. But it also produces a large file. Compression applied to decrease for file size can mean degraded color or dropped frames, leaving you with a You Tube video that looks nothing like your original production – but is erratic, muddy and dark instead.

Think of silent movies, which were originally shot at a lower frame rate than later sound films. When a silent movie is played back on a modern sound projector, with no adjustment to the frames per second, the movie seems to be in fast motion, giving everything a slightly ridiculous look.

On the other hand, if you try to reduce file size by choosing a very low frame rate for a high motion video, the film seems to move in fits and starts, with jerky and choppy motion.

To further add to the problem, video on the internet is dependent on the bandwidth of both the broadcasting and the receiving computer. If the connection speed cannot keep up with the video traffic, the video may stop and start repeatedly while traffic catches up with content (see *Bit Rate* for a more complete explanation).

So it is very important to choose a frame rate for your video that will

1. Keep your content flowing smoothly within the video and
2. Keep your data flowing evenly across the internet for an average viewer

On You Tube, this is usually between 15 frames per second (for a low motion video, such as a screencast) and 30 frames per second (for a full motion AVI).

## key frame rate



In video, the **key frame rate** is another variable that will affect both the smoothness of the motion and the file size of the finished product. The more key frames a video contains, the smoother the motion appears. Key frame rate is usually expressed as one key frame every “x” number of frames. The higher the value of “x” - the fewer key frames your movie will have.

A key frame stores all the information in the data stream. It contains a complete picture, but more than that, it also marks the beginning or end of a sequence. To save space, all data between key frames will represent only changes in the sequence, rather than the complete sequence.

This concept is easiest to grasp if you think about a cartoon.<sup>1</sup> In an animated sequence, only a character’s lower jaw and mouth may move as the character speaks. The background, hair, and clothing can remain static. In a video, the keyframe would contain the complete picture, including the background. The interframes might contain only the data that is different than the keyframe’s - that is, the data needed to create the illusion of movement. And the next key frame would contain all the data to draw the complete picture on screen again.

Just to make this concept, already fairly abstract, more complicated, key frames are usually measured in the number of frames between key frames. But - they can also be expressed in time: a key frame every x seconds. For instance, with QuickTime, Apple recommends a keyframe every 5 seconds. You don’t need to worry about translating one formula into another. The compressor you are using will do all the mathematical heavy lifting. By and large, as long as you know what a key frame is, you can work with your video program’s default key frame rate - adjusting it as necessary for best results.

The fundamental idea is this: the more key frames a video contains, the more complete frames of data a viewer will see, and the more smoothly the pictures will flow.

So why not make every frame a key frame? As is often the case, there is a trade off between quality and file size. More keyframes equals a larger file. If you are

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<sup>1</sup> Key frames have a special function in animation which is different than video. However, the concepts are similar and one helps illustrate the other.

showing video on the web, the extra file size may itself result in starts and stops in the action, as the viewer's connection struggles to keep up with the flow of information. Anything achieved through extra key frames may be lost to internet choke points.

It is important to select a key frame rate that matches the needs of your production and the connection speed of your average viewer. A screencast of a PowerPoint presentation will only need to match the keyframes to the slide transitions, so a low key frame rate will be acceptable. One key frame for every 80 frames should work well. On the other hand, for full motion videos, such as those shot with a camcorder, a key frame every 80 frames is usually the minimum acceptable key frame rate. One key frame for every 30 frames is better suited to action. If your video is not only full motion, but high motion (for instance, a soccer game instead of a lecture), you should use a key frame every 30 frames. Experiment until you are happy with your results – this is not a one size fits all setting.

## Part 2 Sound Equipment

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### microphones

■ We've read that a good video is 60% audio. And the fastest way to improve your movie's sound is to use a stand-alone microphone. But *which* microphone – and what *type* of microphone – should you choose?

■ All camcorders come with built-in microphones. High-end camcorders even record in Surround Sound Stereo. The trouble is, these mics are, by design, *omni-directional*. That means they pick up sound equally from all directions.

What's wrong with that?

Technically, nothing. In fact, omni-directional microphones are usually the most accurate at reproducing sound. But on a camcorder, one of the closest sounds to the mic is usually the sound of the motor that moves the tape through the camcorder. Your video might have a low, but distinct, whirring hum throughout, caused by the microphone picking up this sound. Secondly, you don't really want every sound in your environment on your video. Traffic noises, barking dogs, ringing phones, chatting pedestrians – unless they contribute to the story you want to tell, these sorts of background sounds are just noise. It is a slow, tedious, and sometimes technically challenging job to remove them in post production. Better to never record than at all.

Before just saying, “Use a lavalier!” – and if you want to cut to the chase, that’s what I’m going to say - let’s dig into some of the wickedly dense jargon audiophiles use. Deciphering it will help you choose the perfect microphone for your project.

Microphones themselves are described as dynamic or capacitor (with other sub categories); microphone pick up patterns are omni-directional or directional (with sub categories); and microphone sensitivity is usually expressed as frequency response with a certain dynamic range (for instance: 20 to 20,000 Hz frequency response, dynamic range 71 dB, with a 39 dB noise level).

Ugh. To me, that’s 100 times worse than anything video nerds throw around. But, once it is translated into plain English, audio jargon is extremely useful for ensuring you use the right tool for the job. So let’s try to untangle some of the gobbledygook.

## ~~omni-directional or cardio?~~

This isn’t a lesson in sound recording. We aren’t going to discuss signal to noise ratios or gain or tonal range. In fact, we won’t even touch on the sorts of things musicians look for when they shop for microphones. When you are shooting online or how-to videos, you are usually recording voices. So, to keep this discussion on track, that’s all we’re going to consider as we decide which microphone is right for the job.

First, you need to decide on the correct *Pick Up Pattern*. To record some sounds and not others you will need a specific type of pick up pattern. As we’ve seen, **omni-directional** mics pick up sound from every direction. *Unidirectional* mics (usually just called **directional microphones**) only record sound from one direction – usually directly in front. They are the best choice for voice over narration and interviews.

The best directional microphones are called cardioid (or super cardioid and hyper cardioid).

**Cardioid** is one of those technical terms that seem designed to keep newcomers out of the club. But once you decode it, cardioid is actually a useful term, because it tells you exactly what you want to know about the pick up pattern – or the area of sounds that the mic is likely to record. *Cardioid* is from the same root as *cardiac*. The pick up pattern of a cardioid microphone is heart-shaped. In other words, it is a directional mic that picks up sound from directly in front, slightly less from the sides, and not at all from the rear. Imagine a drawing of an upside down valentine heart in front of your microphone, and you’ll have a good idea of what sounds you will hear on your video if you use a



cardioid microphone. If the mic is pointed at the subject, the speaker's voice will be clear and background noises will be muted or absent altogether.

## electret microphones

Another term you're likely to see when shopping for a microphone is "**Electret.**" Microphones use electricity to turn waves into sound through the vibrations in the mic's diaphragm. The amount of electricity available to the microphone varies, and some mics require a pre-amp or other external source. Electret microphones have become popular because they are inexpensive and can be powered by tiny watch style batteries. Most lavalier microphones will be labeled "Electret." When you see that, just remember: 'Electret' is French for 'Buy Extra Batteries.'

## what's the frequency?

Microphone specs will usually mention a **frequency range** (in Hertz or Hz) and perhaps also noise level (in decibels of dB). The frequency response of a good microphone will usually be in the 20 Hz to 200 KHz range. Better microphones "roll off" sound below 50 Hz, which minimizes things like popping sounds when you say the letter "P" or "B." If a microphone is, in all other aspects, a "good microphone," you can probably just assume it has a good frequency response. Don't get hung up on the numbers.

## shotgun vs lavalier

Now that we've defined some of the insider lingo, let's put it to practical use and talk about real microphones. Although there will always be exceptions, when you are producing online and how-to videos, you will usually be choosing between two styles of microphone: the **Shotgun** mic and the **Lavalier**.



A shotgun microphone replaces the built in mic on your camcorder. It will be a directional microphone that is insulated from shocks produced by handling the camcorder, often by an elaborate looking shock mount. The mount will also remove the microphone from proximity to the motor, eliminating unwanted motor hum.

A good shotgun microphone will pick up enough ambient sound to make an event feel "live." Speakers will not need to be right on top of the mic, but pointing the microphone at the speaker will definitely improve the quality of the audio.

The Rode Videomic is one of the most popular (and affordable) shotgun microphones for consumer camcorders. Let's look at some specs:

- **Power:**  
9V battery powered
- **Directional Pattern:**  
Super Cardioid
- **Frequency range:**  
40Hz-20kHz, selectable HPF @ 80Hz/12dB/octave
- **Signal noise ratio:**  
74 dB SPL (A - weighted per IEC651)

While some of that is still technical mumbo-jumbo, we can decode enough to know that a Rode shotgun will be less sensitive to sounds from the sides and back and that it probably rolls off low frequency sounds - a perfect combination for recording events where individual speakers cannot be miked.

Even if you are unfamiliar with the name, you've seen a **lavalier microphone** in use many times. Lavaliers are the small, clip on mics that news people and talk show guests have fastened to their lapels.

If you are interviewing someone, recording testimonials, demonstrating a product, or describing a scene - it is hard to beat a lavalier microphone. Clipped to your clothing right around the sternum, a cardioid lavalier microphone will pick up your voice while rejecting most ambient noise.

Lavaliers tend to be less expensive than shotgun microphones. In fact, you can find them online for less than \$50.00.

Here are the specs for one model sold on Amazon:

#### **Audio-Technica AT831C Miniature Cardioid Lavalier Microphone**

- Element: Condenser
- Polar Pattern: Cardioid
- Frequency Response: 40 - 20,000 Hz
- Open Circuit Sensitivity: -42 dB (7.9 mV) re 1V at 1 Pa

And here's the title of another:

#### **Sony ECM-C115 Omnidirectional Clip-On Business Microphone**

- Clip-on electret condenser microphone with windscreen
- Omnidirectional pick-up pattern
- 71 dB dynamic range; 39 dB noise level
- 50 to 15,000 Hz frequency response



Both are good microphones, but how do you choose between them? Technical descriptions and industry jargon, once defined, can help you decide which microphone to buy. If you want to isolate the sound of the speaker's voice, all else being equal, you would tend toward the cardioid (Audio Technica) mic. If you hope to include some background sounds, the Sony might be a better choice.

## Headsets

So far, we've been talking about microphones to use with camcorders. Screencasters (and podcasters) have a different set of needs. Typically, they will narrow down their choices to two styles of microphones: desktop or headset.

Whichever style you choose, you'll find you get better sound if you use a USB microphone rather than one that plugs into your computer's sound card. Some computers do have super sound, but most, even with expensive sound cards, have poor audio inputs. If you don't want to buy a pre-amp, go with USB.

If you use a headset, and find that you are plagued by popping sounds whenever you say a word that begins with a "B" or a "P" (the letters known as "plosives"), try this. Instead of wearing the headset over your head with the mic positioned in front of your mouth, let the headphones/earphones rest around your neck and angle the microphone upwards, so that it is just in front of your nose. Your breath is less likely to hit a mic in this position.

A **USB headset** with warm sound will probably cost no more than \$50.00. Rather than using all the technical terms that video mics employ, the average headset will simply describe itself as noise cancelling.



A **desktop microphone** will offer a choice between omni and directional pick ups. Some, like the CO3U, will even be switchable from cardioid, to omnidirectional, to a Figure 8 pattern. They will also be more sensitive to popping and breathing, so you'll get better sound if you invest in a pop filter. Finally, these microphones are heavy. They often come with flimsy tripod stands. Save yourself some aggravation and get a good floor or desktop stand when you buy the microphone. They are surprisingly inexpensive – usually no more than \$25.00.

There is no one size fits all microphone. Experienced videographers, podcasters, and screencasters usually have two or three different microphones that they rely on, depending on the project. However, if your budget is tight, and your camcorder has an external mic jack (not all do!) – your first purchase should be a lavalier microphone. Your videos will sound 100% more professional.

## Guerrilla Video

Just five years ago, a decent video set up, with a low end, professional camcorder and average quality editing software used to cost tens of thousands of dollars. And then, even if you managed to make your own video, there was precious little you could do with it, except maybe show it on late night or open access TV. While less expensive than film, video was still a closed society, with a high financial and technical bar to entry.

Of course, you can still spend tens of thousands of dollars on professional equipment and years in school studying theory and technique; but unless you are actually pursuing a professional career, there is no need. The web has opened up a whole new way to make, distribute, and view videos. It has democratized and revolutionized the medium.

Today's "prosumer" camcorders offer exceptional quality. Some of the best cost under \$1,000 – making profitable DVD production a reality. And for online use, the \$180 Flip Video combines astonishing ease of use with good looking video. You can upload your first Flip video to You Tube within 15 minutes of opening the box – it's that simple.

Editing video has always been a marriage of art and skill, and it still requires practice to become proficient. But the mastery of technique that kept video in the studio and out of reach for the everyday user has, in many respects, gone the way of prohibitively expensive equipment. Powerful computers and inexpensive software can add polish to every production. You don't need to spend years studying before you upload a video to your blog. You just need to do it!

Perry Lawrence, of AskMrVideo.com, calls this "Messy Success." He says that a 'messy' success beats a 'perfect' failure every time. According to Perry, the most important thing you can do is upload one video to You Tube (or a similar video sharing site) every week. It doesn't need to be perfect. In fact, it will *never* be perfect – so perfection is not the goal. Your goal is to gain experience, to overcome your fears, and to get your name and your product before your audience. Every week, try to make the next video better than the last.

Every penny you invest in video will quickly be recouped through increased sales. That's not a sales pitch – it's a fact. Seller after seller has experienced higher sales after adding video to their web site or auction listing. It doesn't matter what field you are in – video is the future of your niche. Real estate, vacation and travel agents, product demonstrations, music, art, even book reviews are all using video.

There is nothing holding you back. There has never been a better time. Jump in and become an overnight sensation.

# Ghost Leg Recommends

To help you get started, here are products and services endorsed by [Ghost Leg Media](#). Click on blue, underlined links for more information.

## SOFTWARE

### **Video Editing**

[Sony Movie Studio Platinum](#)

Microsoft Movie Maker (free) for Windows PCs  
iMove (free) for Macs

## HARDWARE

### **Cameras**

[Flip Video](#) (**cannot** use external microphone)  
[Canon HV30](#)

### **Microphones**

[Audio Technica ATR-35 S Lavalier Microphone](#)  
[Rode Videomic](#)  
[Samson CO3U](#)



[Add Video to eBay Auctions](#)  
Instructional DVD



[Everyone's Guide to Photo Story 3](#)  
Instructional DVD



[The Complete 4 Volume Using Video Workshop on CD Plus Bonus CD](#)  
CD ROM



[Beyond You Tube: Adding Flash to Your Web Site](#)  
CD ROM