Designing A Movie For Sound

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The biggest myth about composing and sound designing is that they are about creating great sounds. Not true, or at least not true enough.

What is Sound Design?
You may assume that it's about fabricating neat sound effects. But that doesn't describe very accurately what Ben Burtt and Walter Murch, who invented the term, did on "Star Wars" and "Apocalypse Now" respectively. On those films they found themselves working with Directors who were not just looking for powerful sound effects to attach to a structure that was already in place. By experimenting with sound, playing with sound (and not just sound effects, but music and dialog as well) all through production and post production what Francis Coppola, Walter Murch, George Lucas, and Ben Burtt found is that sound began to shape the picture sometimes as much as the picture shaped the sound. The result was very different from anything we had heard before. The films are legends, and their soundtracks changed forever the way we think about film sound.

What passes for "great sound" in films today is too often merely loud sound. High fidelity recordings of gunshots and explosions, and well fabricated alien creature vocalizations do not constitute great sound design. A well-orchestrated and recorded piece of musical score has minimal value if it hasn't been integrated into the film as a whole. Giving the actors plenty of things to say in every scene isn't necessarily doing them, their characters, or the movie a favor. Sound, musical and otherwise, has value when it is part of a continuum, when it changes over time, has dynamics, and resonates with other sound and with other sensory experiences.

What I propose is that the way for a filmmaker to take advantage of sound is not simply to make it possible to record good sound on the set, or simply to hire a talented sound designer/composer to fabricate sounds, but rather to design the film with sound in mind, to allow sound's contributions to influence creative decisions in the other crafts. Films as different from "Star Wars" as "Citizen Kane," "Raging Bull," "Eraserhead," "The Elephant Man," "Never Cry Wolf" and "Once Upon A Time In The West" were thoroughly "sound designed," though no sound designer was credited on most of them.

Does every film want, or need, to be like Star Wars or Apocalypse Now? Absolutely not. But lots of films could benefit from those models. Sidney Lumet said recently in an interview that he had been amazed at what Francis Coppola and Walter Murch had been able to accomplish in the mix of "Apocalypse Now." Well, what was great about that mix began long before anybody

got near a dubbing stage. In fact, it began with the script, and with Coppola's inclination to give the characters in "Apocalypse" the opportunity to listen to the world around them.

Many directors who like to think they appreciate sound still have a pretty narrow idea of the potential for sound in storytelling. The generally accepted view is that it's useful to have "good" sound in order to enhance the visuals and root the images in a kind of temporal reality. But that isn't collaboration, it's slavery. And the product it yields is bound to be less complex and interesting than it would be if sound could somehow be set free to be an active player in the process. Only when each craft influences every other craft does the movie begin to take on a life of it's own.

A Thing Almost Alive

It is a common myth that the time for film makers to think seriously about sound is at the end of the film making process, when the structure of the movie is already in place. After all, how is the composer to know what kind of music to write unless he/she can examine at least a rough assembly of the final product? For some films this approach is adequate. Rarely, it works amazingly well. But doesn't it seem odd that in this supposedly collaborative medium, music and sound effects rarely have the opportunity to exert any influence on the non-sound crafts? How is the Director supposed to know how to make the film without having a plan for using music?

A dramatic film which really works is, in some senses, almost alive, a complex web of elements which are interconnected, almost like living tissues, and which despite their complexity work together to present a more-or-less coherent set of behaviors. It doesn't make any sense to set up a process in which the role of one craft, sound, is simply to react, to follow, to be pre-empted from giving feedback to the system it is a part of.

The Basic Terrain, As It Is Now

Many feature film directors tend to oscillate between two wildly different states of consciousness about sound in their movies. On one hand, they tend to ignore any serious consideration of sound (including music) throughout the planning, shooting, and early editing. Then they suddenly get a temporary dose of religion when they realize that there are holes in the story, weak scenes, and bad edits to disguise. Now they develop enormous and short-lived faith in the power and value of sound to make their movie watchable. Unfortunately it's usually way too late, and after some vain attempts to stop a hemorrhage with a bandaid, the Director's head drops, and sound cynicism rules again until late in the next project's post production.

What follows is a list of some of the bleak realities faced by those of us who work in film sound, and some suggestions for improving the situation.

Pre-Production

If a script has lots of references in it to specific sounds, we might be tempted to jump to the conclusion that it is a sound-friendly script. But this isn't necessarily the case. The degree to which sound is eventually able to participate in storytelling will be more determined by the use of time, space, and point of view in the story than by how often the script mentions actual sounds. Most of the great sound sequences in films are "pov" sequences. The

photography, the blocking of actors, the production design, art direction, editing, and dialogue have been set up such that we, the audience, are experiencing the action more or less through the point of view of one, or more, of the characters in the sequence. Since what we see and hear is being filtered through their consciousness, what they hear can give us lots of information about who they are and what they are feeling. Figuring out how to use pov, as well as how to use acoustic space and the element of time, should begin with the writer. Some writers naturally think in these terms, most don't. And it is almost never taught in film writing courses.

Serious consideration of the way sound will be used in the story is typically left up to the director. Unfortunately, most directors have only the vaguest notions of how to use sound because they haven't been taught it either. In virtually all film schools sound is taught as if it were simply a tedious and mystifying series of technical operations, a necessary evil on the way to doing the fun stuff.

Production

On the set, virtually every aspect of the sound crew's work is dominated by the needs of the camera crew. The locations for shooting have been chosen by the Director, DP, and Production Designer long before anyone concerned with sound has been hired. The sets are typically built with little or no concern for, or even awareness of, the implications for sound. The lights buzz, the generator truck is parked way too close. The floor or ground could easily be padded to dull the sound of footsteps when feet aren't in the shot, but there isn't enough time. The shots are usually composed, blocked, and lit with very little effort toward helping either the location sound crew or the post production crew take advantage of the range of dramatic potential inherent in the situation. In nearly all cases, visual criteria determine which shots will be printed and used. Any moment not containing something visually fascinating is quickly trimmed away.

There is rarely any discussion, for example, of what should be heard rather than seen. If several of our characters are talking in a bar, maybe one of them should be over in a dark corner. We hear his voice, but we don't see him. He punctuates the few things he says with the sound of a bottle he rolls back and forth on the table in front of him. Finally he puts a note in the bottle and rolls it across the floor of the dark bar. It comes to a stop at the feet of the characters we see. This approach could be played for comedy, drama, or some of both as it might have been in "Once Upon A Time In The West." Either way, sound is making a contribution. The use of sound will strongly influence the way the scene is set up. Starving the eye will inevitably bring the ear, and therefore the imagination, more into play.

Post Production

Finally, in post, sound cautiously creeps out of the closet and attempts meekly to assert itself, usually in the form of a composer and a supervising sound editor. The composer is given four or five weeks to produce seventy to ninety minutes of great music. The supervising sound editor is given ten to fifteen weeks to—smooth out the production dialog—spot, record, and edit ADR—and try to wedge a few specific sound effects into sequences that were never designed to use them, being careful to cover every possible

option the Director might want because there "isn't any time" for the Director to make choices before the mix. Meanwhile, the film is being continuously re-edited. The Editor and Director, desperately grasping for some way to improve what they have, are meticulously making adjustments, mostly consisting of a few frames, which result in the music, sound effects, and dialog editing departments having to spend a high percentage of the precious time they have left trying to fix all the holes caused by new picture changes.

The dismal environment surrounding the recording of ADR is in some ways symbolic of the secondary role of sound. Everyone acknowledges that production dialog is almost always superior in performance quality to ADR. Most directors and actors despise the process of doing ADR. Everyone goes into ADR sessions assuming that the product will be inferior to what was recorded on the set, except that it will be intelligible, whereas the set recording (in most cases where ADR is needed) was covered with noise and/or is distorted.

This lousy attitude about the possibility of getting anything wonderful out of an ADR session turns, of course, into a self fulfilling prophecy. Essentially no effort is typically put into giving the ADR recording experience the level of excitement, energy, and exploration that characterized the film set when the cameras were rolling. The result is that ADR performances almost always lack the "life" of the original. They're more-or-less in sync, and they're intelligible. Why not record ADR on location, in real-world places which will inspire the actors and provide realistic acoustics? That would be taking ADR seriously. like so many other sound-centered activities in movies, ADR is treated as basically a technical operation, to be gotten past as quickly and cheaply as possible.

Taking Sound Seriously

If your reaction to all this is "So, what do you expect, isn't it a visual medium?" there may be nothing I can say to change your mind. My opinion is that film is definitely not a "visual medium." I think if you look closely at and listen to a dozen or so of the movies you consider to be great, you will realize how important a role sound plays in many if not most of them. It is even a little misleading to say "a role sound plays" because in fact when a scene is really clicking, the visual and aural elements are working together so well that it is nearly impossible to distinguish them. The suggestions I'm about to make obviously do not apply to all films. There will never be a "formula" for making great movies or great movie sound. Be that as it may.....

Writing For Sound

Telling a film story, like telling any kind of story, is about creating connections between characters, places, objects, experiences, and ideas. You try to invent a world which is complex and many layered, like the real world. But unlike most of real life (which tends to be badly written and edited), in a good film a set of themes emerge which embody a clearly identifiable line or arc, which is the story.

It seems to me that one element of writing for movies stands above all others in terms of making the eventual movie as "cinematic" as possible: establishing point of view. The audience experiences the action through its identification with

characters. The writing needs to lay the ground work for setting up pov before the actors, cameras, microphones, and editors come into play. Each of these can obviously enhance the element of pov, but the script should contain the blueprint.

Let's say we are writing a story about a guy who, as a boy, loved visiting his father at the steel mill where he worked. The boy grows up and seems to be pretty happy with his life as a lawyer, far from the mill. But he has troubling, ambiguous nightmares that eventually lead him to go back to the town where he lived as a boy in an attempt to find the source of the bad dreams.

The description above doesn't say anything specific about the possible use of sound in this story, but I have chosen basic story elements which hold vast potential for sound. First, it will be natural to tell the story more-or-less through the pov of our central character. But that's not all. A steel mill gives us a huge palette for sound. Most importantly, it is a place which we can manipulate to produce a set of sounds which range from banal to exciting to frightening to weird to comforting to ugly to beautiful. The place can therefore become a character, and have its own voice, with a range of "emotions" and "moods." And the sounds of the mill can resonate with a wide variety of elements elsewhere in the story. None of this good stuff is likely to happen unless we write, shoot, and edit the story in a way that allows it to happen.

The element of dream in the story swings a door wide open to sound as a collaborator. In a dream sequence we as film makers have even more latitude than usual to modulate sound to serve our story, and to make connections between the sounds in the dream and the sounds in the world for which the dream is supplying clues. Likewise, the "time border" between the "little boy" period and the "grown-up" period offers us lots of opportunities to compare and contrast the two worlds, and his perception of them. Over a transition from one period to the other, one or more sounds can go through a metamorphosis. Maybe as our guy daydreams about his childhood, the rhythmic clank of a metal shear in the mill changes into the click clack of the railroad car taking him back to his home town. Any sound, in itself, only has so much intrinsic appeal or value. On the other hand, when a sound changes over time in response to elements in the larger story, its power and richness grow exponentially.

Opening The Door For Sound, Efficient Dialog

Sadly, it is common for a director to come to me with a sequence composed of unambiguous, unmysterious, and uninteresting shots of a location like a steel mill, and then to tell me that this place has to be made sinister and fascinating with sound effects. As icing on the cake, the sequence typically has wall-to-wall dialog which will make it next to impossible to hear any of the sounds I desperately throw at the canvas.

In recent years there has been a trend, which may be in insidious influence of bad television, toward non-stop dialog in films The wise old maxim that it's better to say it with action than words seems to have lost some ground. Quentin Tarantino has made some excellent films which depend heavily on dialog, but he's incorporated scenes which use dialog sparsely as well.

There is a phenomenon in movie making that my friends and I sometimes call the "100% theory." Each department-head on a film, unless otherwise instructed, tends to assume that it is 100% his or her job to make the movie work. The result is often a logjam of uncoordinated visual and aural product, each craft competing for attention, and often adding up to little more than noise unless the director and editor do their jobs extremely well.

Dialogue is one of the areas where this inclination toward density is at its worst. On top of production dialog, the trend is to add as much ADR as can be wedged into a scene.. Eventually, all the space not occupied by actual words is filled with grunts, groans, and breathing (supposedly in an effort to "keep the character alive"). Finally the track is saved (sometimes) from being a self parody only by the fact that there is so much other sound happening simultaneously that at least some of the added dialog is masked. If your intention is to pack your film with wall-to-wall clever dialog, maybe you should consider doing a play

Characters need to have the opportunity to listen.

When a character looks at an object, we the audience are looking at it, more-or-less through his eyes. The way he reacts to seeing the object (or doesn't react) can give us vital information about who he is and how he fits into this situation. The same is true for hearing. If there are no moments in which our character is allowed to hear the world around him, then the audience is deprived of one important dimension of HIS life.

Picture and Sound as Collaborators

Sound effects can make a scene scary and interesting as hell, but they usually need a little help from the visual end of things. For example, we may want to have a strange-sounding machine running off-camera during a scene in order to add tension and atmosphere. If there is at least a brief, fairly close shot of some machine which could be making the sound, it will help me immensely to establish the sound. Over that shot we can feature the sound, placing it firmly in the minds of the audience. Then we never have to see it again, but every time the audience hears it, they will know what it is (even if it is played very low under dialogue), and they will make all the appropriate associations, including a sense of the geography of the place.

The contrast between a sound heard at a distance, and that same sound heard close-up can be a very powerful element. If our guy and an old friend are walking toward the mill, and they hear, from several blocks away, the sounds of the machines filling the neighborhood, there will be a powerful contrast when they arrive at the mill gate. As a former production sound mixer, if a director had ever told me that a scene was to be shot a few blocks away from the mill set in order to establish how powerfully the sounds of the mill hit the surrounding neighborhood, I probably would have gone straight into a coma after kissing his feet. Directors essentially never base their decisions about where to shoot a scene on the need for sound to make a story contribution. Why not?

Art Direction and Sound as Collaborators

Let's say we're writing a character for a movie we're making. This guy is out of money, angry, desperate. We need, obviously, to design the place where he lives. Maybe it's a run-down apartment in the middle of a big city. The way that place looks will

tell us (the audience) enormous amounts about who the character is and how he is feeling. And if we take sound into account when we do the visual design then we have the potential for hearing through his ears this terrible place he inhabits. Maybe water and sewage pipes are visible on the ceiling and walls. If we establish one of those pipes in a close-up it will do wonders for the sound designer's ability to create the sounds of stuff running through and vibrating all the pipes. Without seeing the pipes we can still put "pipe sounds" into the track, but it will be much more difficult to communicate to the audience what those sounds are. One close-up of a pipe, accompanied by grotesque sewage pipe sounds, is all we need to clearly tell the audience how sonically ugly this place is. After that, we only need to hear those sounds and audience will make the connection to the pipes without even having to show them.

It's wonderful when a movie gives you the sense that you really know the places in it. That each place is alive, has character and moods. A great actor will find ways to use the place in which he finds himself in order to reveal more about the person he plays. We need to hear the sounds that place makes in order to know it. We need to hear the actor's voice reverberating there. And when he is quiet we need to hear the way that place will be without him.

Starving The Eye, The Usefulness Of Ambiguity

Viewers/listeners are pulled into a story mainly because they are led to believe that there are interesting questions to be answered, and that they, the audience, may possess certain insights useful in solving the puzzle. If this is true, then it follows that a crucial element of storytelling is knowing what not to make immediately clear, and then devising techniques that use the camera and microphone to seduce the audience with just enough information to tease them into getting involved. It is as if our job is to hang interesting little question marks in the air surrounding each scene, or to place pieces of cake on the ground that seem to lead somewhere, though not in a straight line.

Sound may be the most powerful tool in the filmmaker's arsenal in terms of its ability to seduce. That's because "sound," as the great sound editor Alan Splet once said, "is a heart thing." We, the audience, interpret sound with our emotions, not our intellect.

Let's assume we as film makers want to take sound seriously, and that the first issues have already been addressed:

1) The desire exists to tell the story more-or-less through the point of view of one or more of the characters.

2) Locations have been chosen, and sets designed which don't rule out sound as a player, and in fact, encourage it.

3) There is not non-stop dialog.

Here are some ways to tease the eye, and thereby invite the ear to the party:

The Beauty of Long Lenses and Short Lenses

There is something odd about looking through a very long lens or a very short lens. We see things in a way we don't ordinarily see them. The inference is often that we are looking through

someone else's eyes. In the opening sequence of "The Conversation" we see people in San Francisco's Union Square through a telephoto lens. The lack of depth of field and other characteristics of that kind of lens puts us into a very subjective space. As a result, we can easily justify hearing sounds which may have very little to do with what we see in the frame, and more to do with the way the person ostensibly looking through that lens FEELS. The way we use such a shot will determine whether that inference is made obvious to the audience, or kept subliminal.

Dutch Angles and Moving Cameras

The shot may be from floor level or ceiling level. The frame may be rotated a few degrees off vertical. The camera may be on a track, hand held, or just panning. In any of these cases the effect will be to put the audience in unfamiliar space. The shot will no longer simply be "depicting" the scene. The shot becomes part of the scene. The element of unfamiliar space suddenly swings the door wide-open to sound.

Darkness Around the Edge Of the Frame

In many of the great film noir classics the frame was carefully composed with areas of darkness. Though we in the audience may not consciously consider what inhabits those dark splotches, they nevertheless get the point across that the truth, lurking somewhere just outside the frame is too complex to let itself be photographed easily. Don't forget that the ears are the guardians of sleep. They tell us what we need to know about the darkness, and will gladly supply some clues about what's going on.

Extreme Close-ups and Long Shots

Very close shots of people's hands, their clothing, etc. will tend to make us feel as though we are experiencing things through the point of view of either the person being photographed or the person whose view of them we are sharing. Extreme long shots are wonderful for sound because they provide an opportunity to hear the fullness or emptiness of a vast landscape. Carroll Ballards films The Black Stallion and Never Cry Wolf use wide shots and extreme close-ups wonderfully with sound.

Slow Motion

Raging Bull and Taxi Driver contain some obvious, and some very subtle uses of slow motion. Some of it is barely perceptible. But it always seems to put us into a dream-space, and tell us that something odd, and not very wholesome, is happening.

Black and White Images

Many still photographers feel that black and white images have several artistic advantages over color. Among them, that black and white shots are often less "busy" than color images, and therefore lend themselves more to presenting a coherent feeling. We are surrounded in our everyday lives by color and color images. A black and white image now is clearly "understood" (felt) to be someone's point of view, not an "objective" presentation of events. In movies, like still photography, painting, fiction, and poetry, the artist tends to be most concerned with communicating feelings rather than "information." Black and white images have the potential to convey a maximum of feeling without the "clutter" of color.

Whenever we as an audience are put into a visual "space" in which we are encouraged to "feel" rather than "think," what comes into our ears can inform those feelings and magnify them.

What Do All Of These Visual Approaches Have In Common?

They all are ways of withholding information. They muddy the waters a little. When done well, the result will be the following implication: Gee folks, if we could be more explicit about what is going on here we sure would, but it is so damned mysterious that even we, the storytellers, don't fully understand how amazing it is. Maybe you can help us take it a little farther." That message is the bait. Dangle it in front of an audience and they won't be able to resist going for it. in the process of going for it they bring their imaginations and experiences with them, making your story suddenly become their story. success.

We, the film makers, are all sitting around a table in pre-production, brainstorming about how to manufacture the most delectable bait possible, and how to make it seem like it isn't bait at all. (Aren't the most interesting stories always told by guys who have to be begged to tell them?) We know that we want to sometimes use the camera to withhold information, to tease, or to put it more bluntly: to seduce. The most compelling method of seduction is inevitably going to involve sound as well.

Ideally, the unconscious dialog in the minds of the audience should be something like: "What I'm seeing isn't giving me enough information. What I'm hearing is ambiguous, too. But the combination of the two seems to be pointing in the direction of a vaguely familiar container into which I can pour my experience and make something I never before quite imagined." Isn't it obvious that the microphone plays just as important a role in setting up this performance as does the camera?

Editing Picture With Sound In Mind

One of the many things a film editor does is to get rid of moments in the film in which "nothing" is happening. A desirable objective most of the time, but not always. The editor and director need to be able to figure out when it will be useful to linger on a shot after the dialog is finished, or before it begins. To stay around after the obvious "action" is past, so that we can listen. Of course it helps quite a bit if the scene has been shot with these useful pauses in mind. Into these little pauses sound can creep on it's stealthy little toes, or its clanking jackboots, to tell us something about where we have been or where we are going.

Walter Murch, film editor and sound designer, uses lots of unconventional techniques. One of them is to spend a certain period of his picture editing time not listening to the sound at all. He watches and edits the visual images without hearing the sync sound which was recorded as those images were photographed. This approach can ironically be a great boon to the use of sound in the movie. If the editor can imagine the sound (musical or otherwise) which might eventually accompany a scene, rather than listen to the rough, dis-continuous, often annoying sync track, then the cutting will be more likely to leave room for those beats in which sound other than dialog will eventually make its contribution.

Sound's Talents

Music, dialogue, and sound effects can each do any of the following jobs, and many more:

- suggest a mood, evoke a feeling
- set a pace
- indicate a geographical locale
- indicate a historical period
- clarify the plot
- define a character
- connect otherwise unconnected ideas, characters, places, images, or moments
- heighten realism or diminish it
- heighten ambiguity or diminish it
- draw attention to a detail, or away from it
- indicate changes in time
- smooth otherwise abrupt changes between shots or scenes
- emphasize a transition for dramatic effect
- describe an acoustic space
- startle or soothe
- exaggerate action or mediate it

At any given moment in a film, sound is likely to be doing several of these things at once.

But sound, if it's any good, also has a life of its own, beyond these utilitarian functions. And its ability to be good and useful to the story, and powerful, beautiful and alive will be determined by the state of the ocean in which it swims, the film. Try as you may to paste sound onto a predetermined structure, the result will almost always fall short of your hopes. But if you encourage the sounds of the characters, the things, and the places in your film to inform your decisions in all the other film crafts, then your movie may just grow to have a voice beyond anything you might have dreamed.

So, what does a sound designer do?

It was the dream of Walter Murch and others in the wildly creative early days of American Zoetrope that sound would be taken as seriously as image. They thought that at least some films could use the guidance of someone well-schooled in the art of sound in storytelling to not only create sounds but also to coordinate the use of sound in the film. This someone, they thought, would brainstorm with the director and writer in pre-production to integrate sound into the story on the page. During shooting that person would make sure that the recording and playing-back of sound on the set was given the important status it deserves, and not treated as a low-priority, which is always the temptation in the heat of trying to make the daily quota of shots. In post production that person would continue the fabrication and collection of sounds begun in pre-production, and would work with other sound professionals (composers, editors, mixers), and the Director and Editor to give the film's soundtrack a coherent and well coordinated feeling.

This dream has been a difficult one to realize, and in fact has made little headway since the early 1970s. The term sound designer has come to be associated simply with using specialized

equipment to make "special" sound effects. On "THX-1138" and "The Conversation" Walter Murch was the Sound Designer in the fullest sense of the word. The fact hat he was also a Picture Editor on "The Conversation" and "Apocalypse Now" put him in a position to shape those films in ways that allowed them to use sound in an organic and powerful way. No other sound designers on major American films have had that kind of opportunity.

So, the dream of giving sound equal status to image is deferred. Someday the Industry may appreciate and foster the model established by Murch. Until then, whether you cut the dialog, write the script, record music, perform foley, edit the film, direct the film or do any one of a hundred other jobs, anybody who shapes sound, edits sound, or even considers sound when making a creative decision in another craft is, at least in a limited sense, designing sound for the movie, and designing the movie for sound.

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How to Get Better Sound for Your Film/ Video

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Recording Better Audio for Video

Written by **Davida Rochman** on March 8, 2010 under **Education**

Not that long ago, DIY videos were pretty much the domain of proud parents capturing the highlights of a family vacation or birthday party. Technology and social media changed all that and today, over 100 hours of video are uploaded to YouTube every day.

Let's say you're ready to join the revolution. You already have a smartphone. Maybe you even have a camcorder or a DSLR camera. The question is this: is it possible to improve the sound quality of your videos using basic gear? Internet video expert Mark Shapiro shares his thoughts and tips.

"Creating good audio is the most difficult challenge when creating Internet videos – especially if you're using consumer-type camcorders. It's easy to fool the eye, but it's a lot harder to fool the ear."

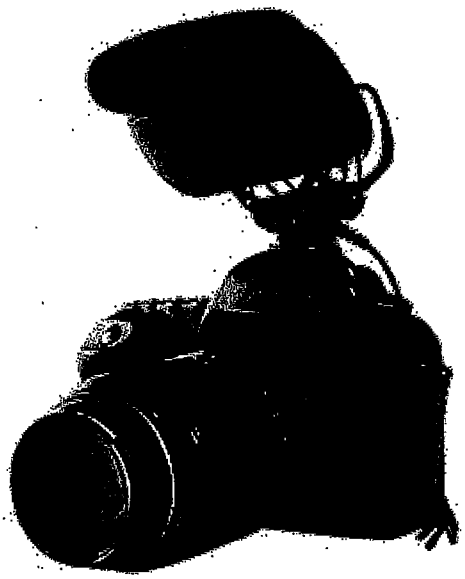
If you make a mistake with audio, the ear will catch it while the eye is a lot more forgiving of video problems

and inconsistencies. And if you spend a lot of time on YouTube and other user-generated video sites, you'll notice that the sound on many of the videos is garbled, muddy and often unintelligible.

Take heart. There are many ways you can make your videos sound a lot better without having to spend lots of money, go to film school or hire a sound engineer to help you shoot your video short. Here are seven.

1. Use an External Microphone

If possible, use an external mic. Unfortunately, the microphones built into most camcorders are not very good. Even worse, they're omni-directional and will pick up sound from everywhere.



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Even though most of these mics have a somewhat ellipsoidal pickup pattern (aimed more toward what is in front), most camcorder mics will pick up mumbling, heavy breathing and other extraneous noises. A few camcorder mics will allow you to slightly focus their mics from wide angle to narrow.

And here's another issue: on many camcorders, the mic is not well located and can easily get in the way of fingers adjusting focus, activating effects and zooming in.

The good news is that digital camcorders record digital sound. This means you should be able to record high fidelity, stereo, and CD-quality sound assuming you can get the audio into the camcorder in the first place. This is why you need an external mic that plugs into the MIC IN jack on your camcorder. Most good camcorders will have a MIC IN connector as well as a shoe to mount the mic on.

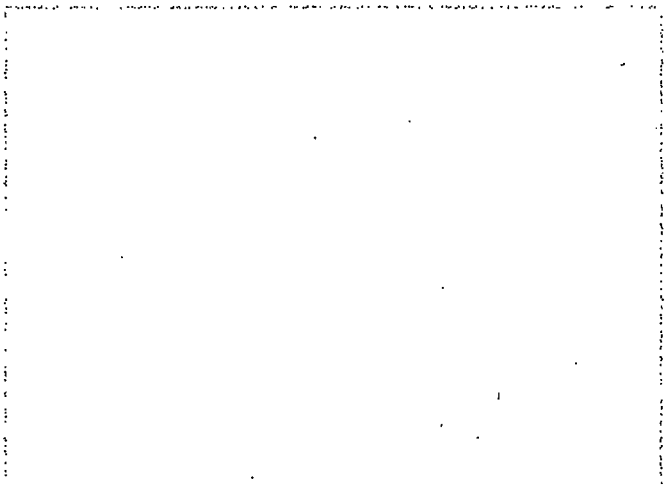
Unfortunately, many of the more affordable camcorders – especially those tiny "pocket size" camcorders, do not offer an external mike connection at all and you need to rely on other tricks to improve the audio.

Some camcorders and all DSLR cameras feature hot shoes. These allow you to mount an external mic onto the shoe and transmit the audio directly from the mic to the camera's electronics.

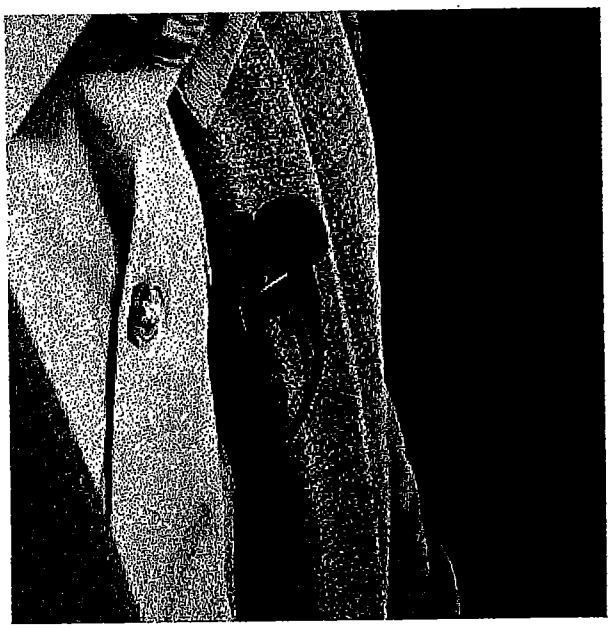
If you're on a limited budget, the best choice for an external mic is a basic telephoto or shotgun that can be adjusted to zoom out when you want to capture the sound from a crowd or zoomed in when you want to capture sound from a source a good distance away. And if you can afford to upgrade, go wireless and get a wireless lavaliere system. Even better, get a wireless kit with a receiver that mounts on the camcorder and includes both handheld and lav wireless mics.

2. Use Lavalier Microphones

A wireless microphone system is usually a bit more expensive than a basic shotgun mic, but allows you to get much better sound.



I prefer using these for shooting interviews. Instead of using a handheld mic or a shotgun mic, simply pin the wireless lavalier and its transmitter to the interviewee's lapel or jacket and then the sound of their voice will be transmitted back to the receiver unit that is mounted on your camcorder.



MOTIV™ MVL Lavalier Microphone

In most interview situations, you don't really need to hear the questions except for in the editing process. Of course, if the interviewer's voice is important, then use another lav mic or have them hold a mic. Feed both mics through an audio mixer and then into the camcorder.

FYI – In many video interview situations, one camera is used to capture video and sound of the interviewer and a second camera is used to capture video and sound of the person being interviewed.

3. Close Mic

If you don't have a shotgun mic or good wireless microphone system, or if your camcorder doesn't have an audio input jack, then the next best thing is to get close.

If you need a long shot for artistic reasons, you might want to shoot the scene again – just for audio. Have your actors do their lines a second time so that you can get good quality audio and then dub it in later to replace the bad audio. If the shot is far enough away, the audience will never notice that the actors' mouth movements don't exactly match the audio.

During the editing process, you can also have your actors re-record the audio, duplicating the original dialog so that it matches. You might want to use the same camcorder to record the audio so that the audio quality matches. Also, this is where room tone can be very important.

Most camcorders have an electronic circuits built into them called AGC or Automatic Gain Control. It automatically adjusts the sound recording level so that the camcorder will pick up something, no matter how faint. The further you are away from your sound source, the more the AGC has to magnify the sound. The more it amplifies the audio, the more it also amplifies the surrounding noise as well.

If the audio source is faint, the camcorder may adjust the AGC pick-up sensitivity so high that it even picks up the sound of the camcorders motors and gears.

And don't forget – getting close will not only make your audio sound better, it will make your video look better.

4. Record Continuous Sound of Events or Performances

If there are problems or breaks in the audio, it's almost impossible to cover them up by using creative editing. If a visual doesn't quite match or you get a strange out of focus shot or two, it's easy to replace it with a cut-away or new angle. But with audio, your audience will notice every small change and gap in the recording.

When you record a performance or event, make sure you record and capture the sound as a continuous event – without any breaks. While the camcorder is rolling and capturing the sound, you can be zooming in and out, getting different shots, shooting close-ups, and so on.

For example, when I was in Hawaii with my kids, I taped my kids' hula lesson. Later on, it was easy to edit the video by just inserting shots of new video over the clean audio track. In addition the shots of the class itself, I inserted visuals of the entire Hawaii trip.

5. Monitor Your Audio

If your camcorder has an earphone or headphone jack, use it! Especially when recording tricky audio situations like concerts and live performances. Even though you don't want to be recording where the audio levels are too low, you also don't want audio that is too loud or distorted. In concerts, it may be helpful to turn the mic away from the stage and catch the sound coming from the ceiling.

SRH440 Studio Headphones

By using headphones, you can monitor the sound. This is very important when a dead battery or a disconnected mic plug or cable may spell disaster.

6. Use a Portable Audio Mixer

Professional video makers just don't plug their mics directly into the camcorder and record raw sound, especially when recording a concert performance.

By using a mic mixer with level controllers, you can use several mics to get the best quality sound for recording stereo. Most mic mixers also provide a headphone jack for monitoring the audio quality as well as record volume dials.

On many pro camcorders, this mixer and volume control system is built into the camera. And some camcorders allow the operator to record, control and monitor up to four different audio tracks.

7. Capture Room Tone

If you plan on editing your videos, you'll want to remember to capture a minute or two of room tone (or the ambient sound of the location when nothing is happening).

Every location has its own background buzz. It can be the sound of the surf pounding away in the distance, it can be the sound of the city outside the walls of a ballroom, and it can even be the soft buzzing of the lights and electronics in an office. By recording this background tone and using it while editing, you will be able to insert it into your video to cover any gaps in your audio recording. By cross fading from the good sound to the background tone, the loss of audio won't be as jarring as going from voices and singing to deafening silence. If you are mixing in new sound or recording dialog, you can help make it seem like it really belongs by mixing it with the environmental sounds.

If you are able to integrate these seven tips above into your daily video shooting process, you will find that your videos suddenly seem to be much better. Your friends and family might not be able to put their finger on it they may not be able to isolate what has improved, but they will definitely better appreciate your work.

Davida Rochman

A Shure associate since 1979, Davida Rochman graduated with a degree in Speech Communications and never imagined that her first post-college job would result in a lifelong career that had her marketing microphones rather than speaking into them. Today, Davida is a Communications Manager, lending her skills to a wide spectrum of activities, from public relations and social media to content development and sponsorships.

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Recording Sound Elements for Video

Dean Miles targets the one-person-camera operator and explains the importance of recording sound elements to

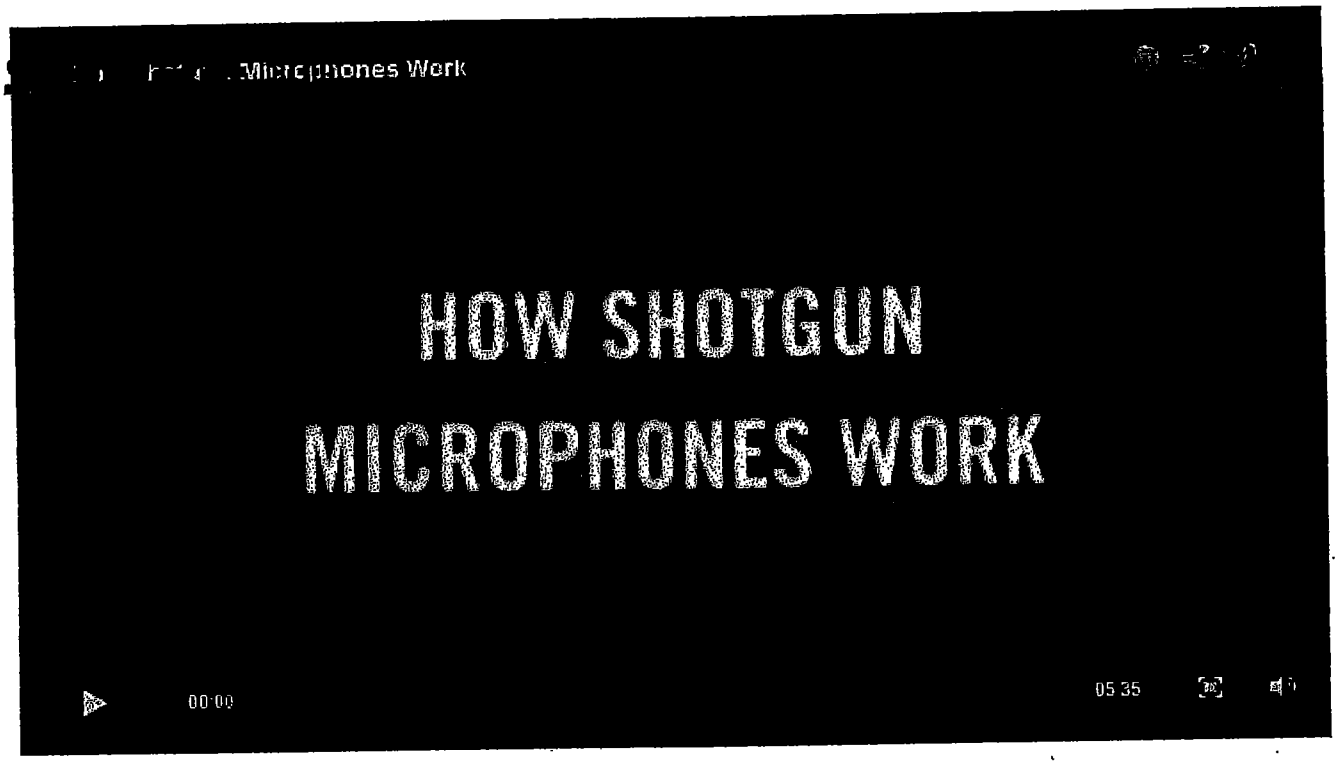
Shotgun Mics and Video Production

Written by **Davida Rochman** on April 17, 2012 under **Education**

If there's one thing we've learned, it's that audio quality can make or break any video project. No matter how creative and professional the visual aspects of a production may be, these qualities can be completely negated by lackluster audio. According to one videographer we know, "It's easy to fool the eye, but it's a lot harder to fool the ear".

Creating good audio can be a real challenge when shooting video – especially if you're using a consumer-grade camcorder. Mics that are built into camcorders aren't really designed for high-quality audio. They are designed for sound sources that are very close to the camera and they tend to pick up a lot of background noise.

Adding an external mic – a handheld, lapel (or lavalier) or a shotgun mic – gives you what matters the most – the best signal-to-noise ratio. Here are some tips about the third type – the shotgun mic. Its extremely directional pickup pattern (called a line/gradient pattern) makes the shotgun mic popular for TV news and movie sets.



The shotgun microphone is named for the long, slotted tube in front of the microphone cartridge that makes it resemble a shotgun. This "interference tube" helps reject sounds coming from more than about 30 degrees off to the sides, while still picking up sounds from the front. Because a shotgun mic is either mounted to a camera or a boom, it is rarely seen by the viewer. In fact, it's almost impossible to imagine a situation in which the mic *should* appear in frame (unless you're making a video about making a video).

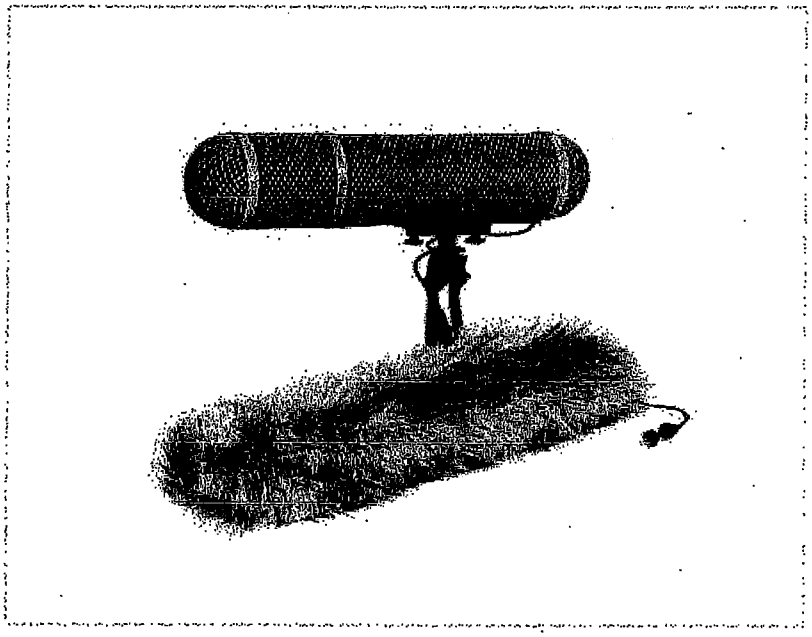
Advantages

Let's talk about what shotguns mics are not: *They are not telephoto lenses for sound.* They do not allow you to zoom in on a conversation from 100 feet away.

Here is how Shure's Chris Lyons explains it: *"Imagine looking through a long tube at a person standing 20 feet away. The person's image does not appear to be any larger or closer, but is somewhat easier to see, because the eye is not distracted by things happening off to either side."*

This is exactly what shotgun mics do best: they screen out sounds coming from the sides. In practice, a shotgun microphone can typically be placed at four to five times the acceptable distance for a standard omnidirectional microphone. But keep in mind that the shotgun mic will also pick up sounds coming from behind the subject.

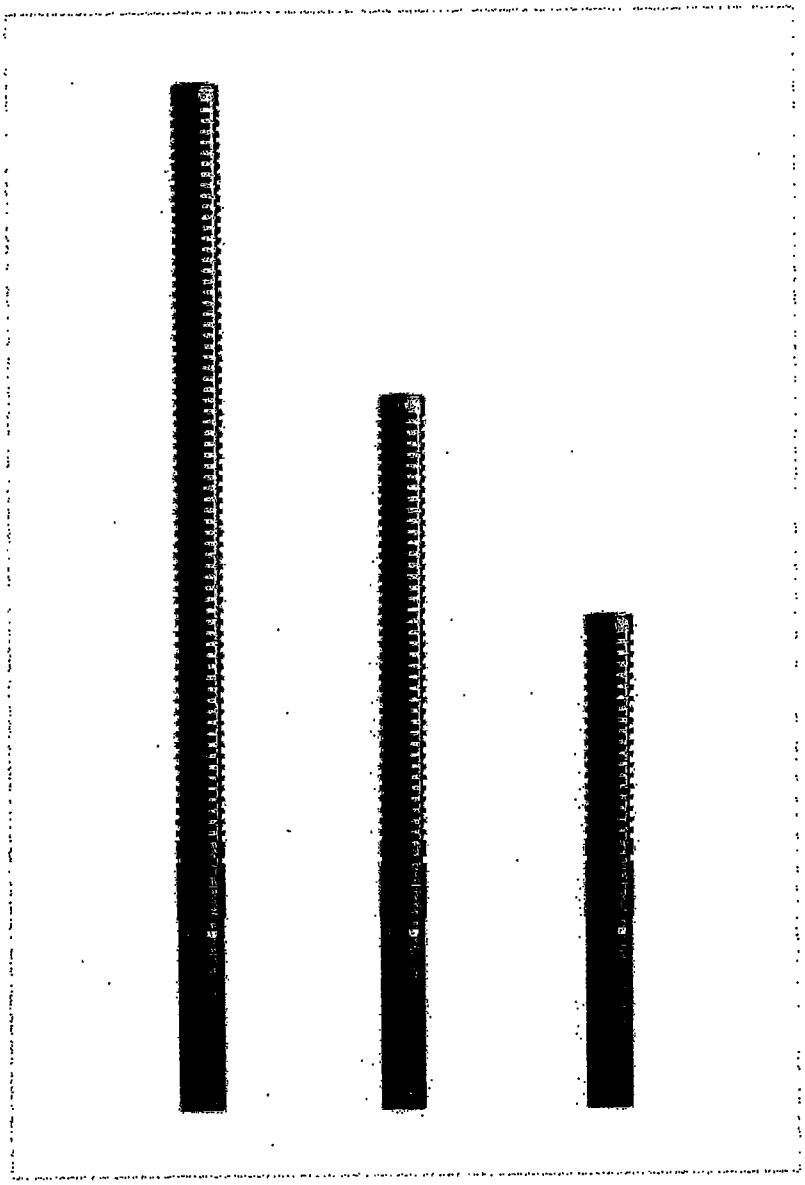
- Shotgun mics can be positioned slightly above, below, or to the side of the sound source, so that the mic doesn't appear in the camera frame.
- Try to avoid aiming the mic at a hard surface, such as a tile floor, brick wall, or hard ceiling. These surfaces reflect sound waves, and may reflect background noise into the microphone or cause the sound to be slightly hollow. (A heavy blanket can be placed on a reflective surface to provide some temporary sound absorption.)
- Shotgun mics are more sensitive to wind noise than standard microphones, so try to avoid moving the mic rapidly and use a foam windscreen if possible. (Larger "zeppelin" or "blimp" type windscreens are usually necessary outdoors.)
- It's a good idea to use a rubber-isolated shock mount to control handling noise that may be transmitted through a stand or boom.
- If you're using a boom for a scripted video, make sure your boom person has a script. If more than one speaker is going to be miked, the boom person needs to point the shotgun at the right person at the right time, a challenge when the mic needs to remain out of frame, the sound has to be consistent and the boom may be over 20 feet long.



What to look for when buying a shotgun mic

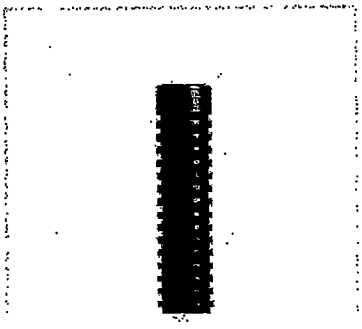
Mics with a balanced XLR outputs signals will give you better noise and interference immunity. Remember, too, that if you have a stereo mini-jack input on your camcorder, you'll need to get an XLR camcorder adapter that will allow you to use professional quality microphones.

Shure offers these options of shotgun microphones.



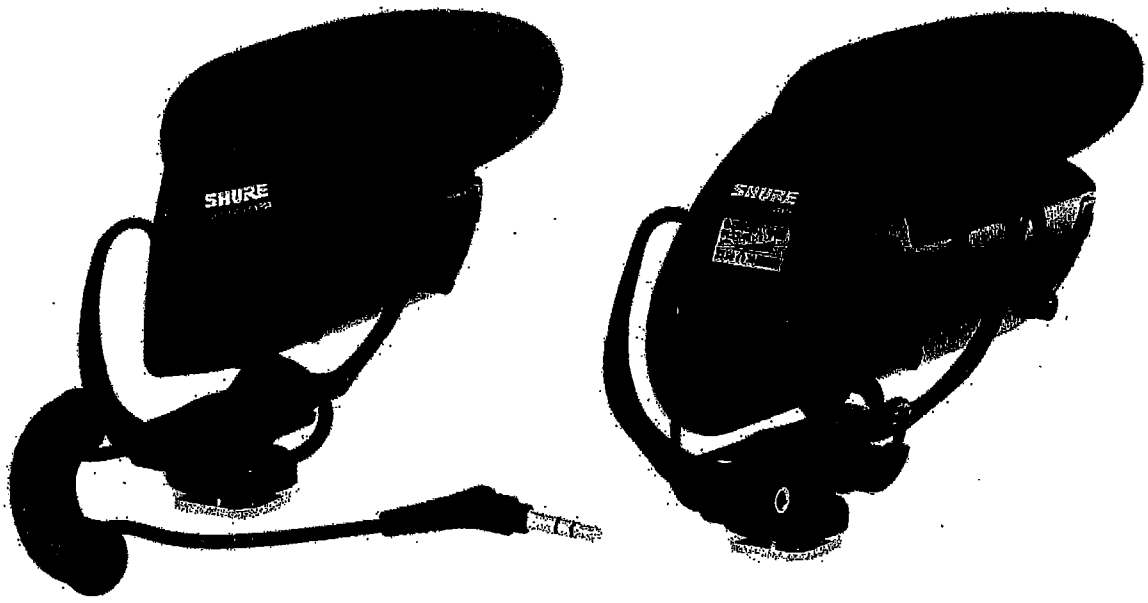
VP89

Offers a choice or interchangeable long, medium and short capsules. Hand-tuned and assembled in the US, offers natural off-axis rejection without coloration.



VP82

This mic is designed for camera-mounted applications. It is extremely lightweight and has an integrated preamp.



VP83 LensHopper VP83F LensHopper

VP83 /VP83F LensHopper

These camera-mounted mics record directly to the DSLR or digital audio recorder. The VP83F features a built-in flash recorder, eliminating the need for an external recording device.

For more information about shotguns and other media production products, visit **http://www.shure.com/americas/broadcast/overview**.

Producer SueAnn Shiah explains her journey as a music business major catapulted into the world of DSLR filmmaking, and how the Shure VP83F LensHopper played a part.

Recording Better Audio for Video

Not that long ago, DIY videos were pretty much the domain of proud parents capturing the highlights of a family vacation or birthday party. Technology and social media changed all...

Choosing a Shotgun Microphone: The Long and Short of It

Written by **Matthew Koschak** on May 17, 2016 under **Education**

One of the most misunderstood types of microphones is the interference-type line microphone, commonly referred to as a "shotgun" microphone. It's pretty clear how it got this nickname. It's much longer than a typical end-address microphone and resembles the barrel of a shotgun. You may have seen them at press and sporting events or on movie sets, mounted to a boom pole or strapped to the top of a camera.

Why is it so long? Why are there so many lengths available? When do you need a shotgun mic? Which length is right for you? This post will answer all of those questions.

Shotgun microphones: uses and misconceptions

Shotgun microphones fall into a category called "high-directionality microphones." They are more directional than a typical cardioid or supercardioid microphone. This means that they reject unwanted sounds coming at the microphone from the sides, thus allowing clearer pickup of the desired sound source at which the microphone is pointed, or the "on-axis" source. A typical use for a shotgun microphone is to pick up a desired sound

source located some distance away, and that, for whatever reason, cannot be approached or close miked. Think of the bat crack from a Major Leaguer or a lion's roar.

A common misconception is that they magically reach out and grab the sound coming from a source; however, in reality, shotgun mics merely reject more of the undesirable off-axis sound (see **The Myth of Microphone Reach** in the FAQs on shure.com for details). This could be noise from a busy street or excessive room sound in a space where you're recording dialog. Shotguns are also used in voiceover work, typically in situations where you don't have a proper non-reverberant vocal booth and you need a really close and present voiceover sound. Again, the shotgun will reduce the reflected room sound that comes into the mic off-axis.

Characteristics of shotgun microphones

The main characteristic we've talked about so far is **high directionality**. Other things to look for in a shotgun microphone are **high sensitivity** and **low self-noise**. ("**Self-noise**" is the noise introduced to the audio path by the microphone's circuitry. Using a microphone with too high a self-noise to capture very quiet sounds will result in audible hiss.) As mentioned earlier, shotguns typically are used when capturing sources at a distance. This often means trying to pick up a low-level signal, which is why a proper shotgun microphone needs to have a higher sensitivity than microphones designed to pick up close sources. Since the low-level sound will need to be amplified to a usable signal level, having a mic with low self-noise is critical.

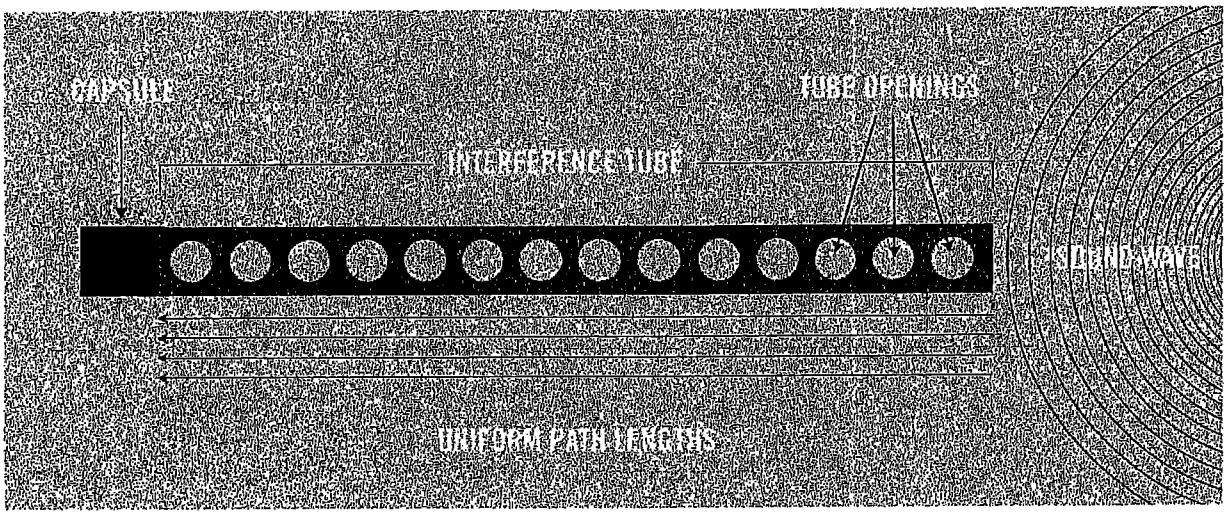
What "lobar" means (and more misconceptions)

If you've looked at shotgun mic specifications, you've likely seen microphones specified as "supercardioid/lobar" or "hypercardioid/lobar." Understanding those terms requires knowing a little bit more about how a shotgun microphone

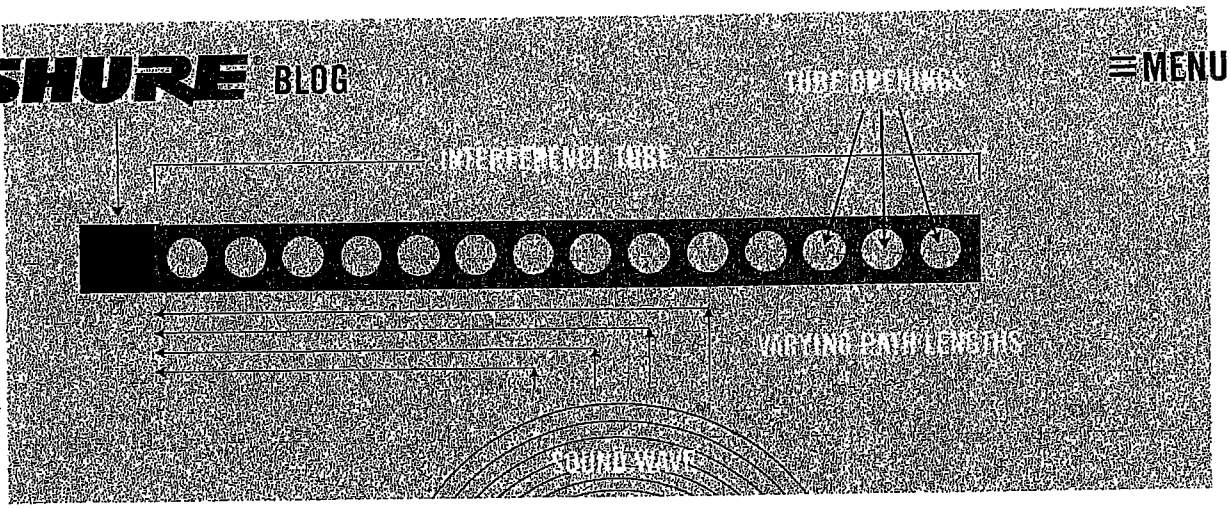
gets its characteristic directionality. This is the result of an interference tube, which is mounted to the front of the microphone capsule (typically a condenser). It has several openings along its length, which are designed to allow sound to enter the tube.

The interference tube enables the microphone to discriminate between on-axis and off-axis sounds by forcing each type of sound to arrive at the capsule in a different manner.

On-axis sounds share a uniform path length to the microphone capsule. Because they arrive at the same time, they end up being what we call "in phase" and are thus accepted by the mic element and passed down the audio circuit.



Off-axis sounds arrive at the openings of the interference tube at the same time, but they will have different paths to the capsule depending upon where they enter the tube. Sounds that enter farther down the tube have a longer path length than those entering nearer to the capsule. These waves arrive at different times and are thus "out of phase," which results in the phase cancellation of that sound. Maximum cancellation occurs at frequencies where the phase difference is ½ wavelength.

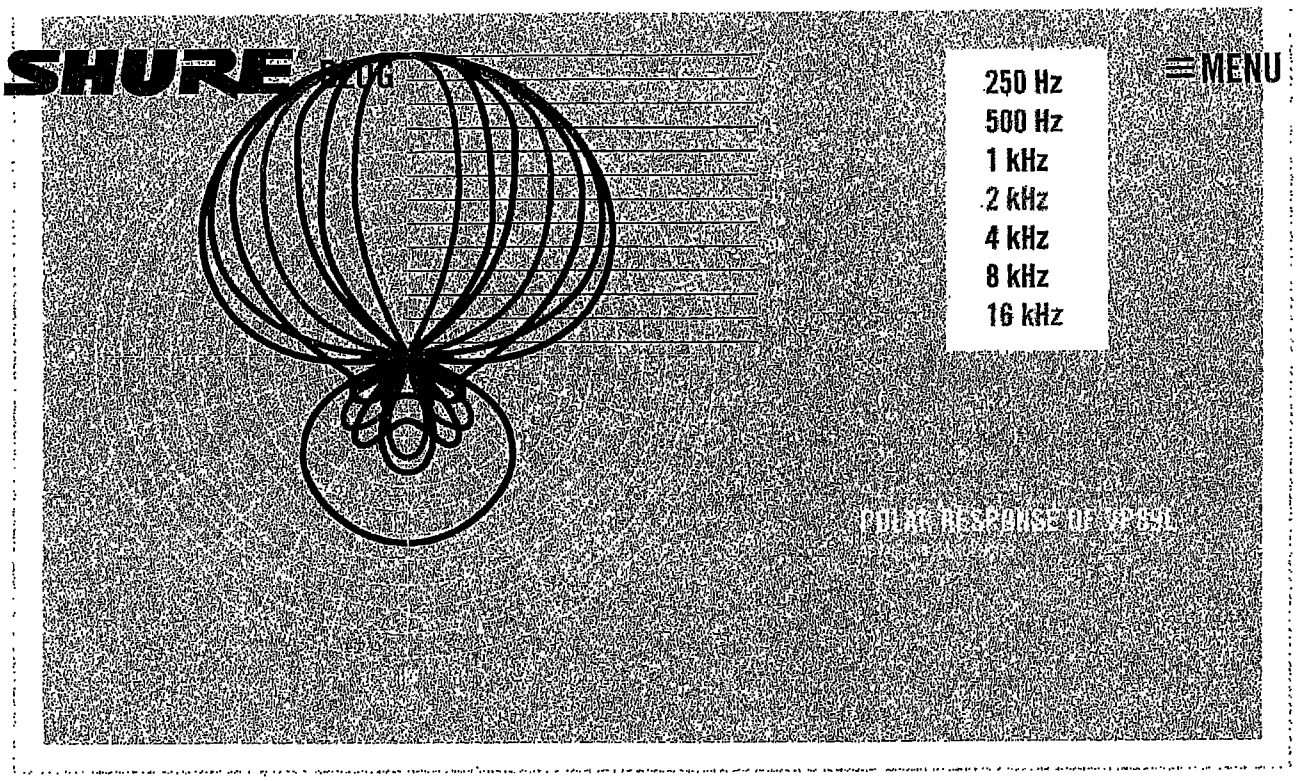


The result is a narrow, highly directional lobe of sound pickup at the front of the microphone. Shotgun polar patterns, characterized by such lobes, are thus called "lobar."

It's important to note that the lowest frequency that can be adequately cancelled is directly related to the length of the interference tube. The longer the tube, the lower the frequency at which the tube is effective in reducing off-axis sound. To reject sound down to, say, 100 Hz would require a tube 5.5 feet long!

Many people think that the length of the tube determines only the overall sound acceptance angle. While that is somewhat true, it's very much a frequency-dependent relationship. Below the frequency at which the interference tube is effective, the directional pattern comes from the microphone cartridge itself, usually a hypercardioid. The composite polar response would be specified as hypercardioid/lobar: hypercardioid at low frequencies and lobar at frequencies where the tube is working.

Below we see the polar response at several frequencies for the **VP89L**, which has an 18-inch interference tube.



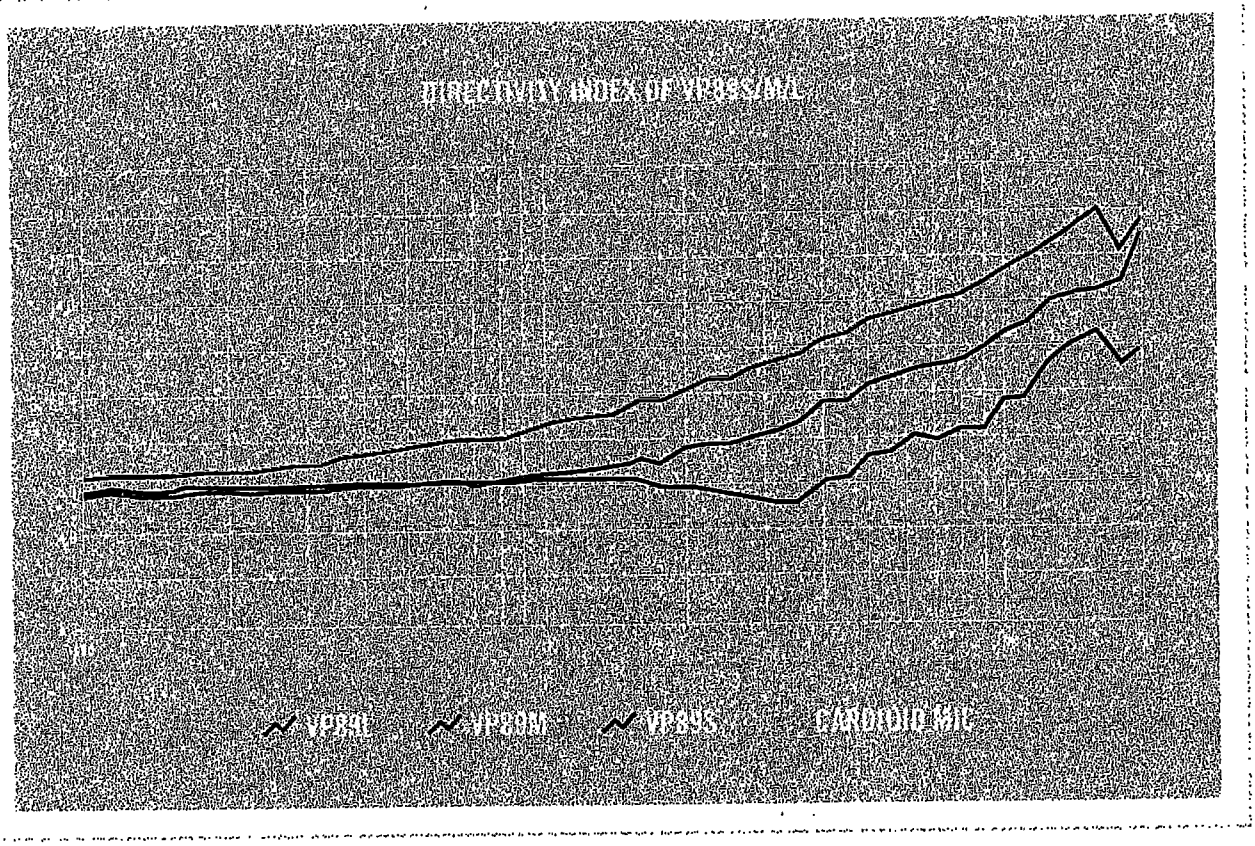
As the frequency increases, the directionality of the microphone pickup pattern becomes much tighter. Because the VP89L interference tube is quite long, the microphone is able to maintain directionality to fairly low frequency, but by around 250 Hz, the polar response is mostly hypercardioid. Also, note the smooth polar response at high frequencies and minimal undesirable side-lobes.

Another way of looking at directionality

A really cool way to understand the directionality of a microphone as it relates to frequency is to look at a graph of its "directivity index" (DI). The directivity index is the ratio of on-axis pickup relative to the sound pickup in all directions, specified in dB. The higher the number, the more directional the microphone.

An omnidirectional microphone has a DI of 0dB since it picks up sound equally in all directions. A hypercardioid microphone has a DI of 6.0 dB. This graph illustrates the frequency at which the microphone's directionality really takes off, which, again, is dependent on its length. The directivity index graph below compares the **VP89S** (short), **VP89M** (medium), and **VP89L** (long) shotguns.

Notice how the cardioid pattern stays uniformly directional with frequency, while the shotgun mics become increasingly directional at lower frequencies proportional to the length of their interference tubes.



So which length should I use?

Depends! A longer interference tube will reject the most off-axis sound, but is also more difficult to work with because of the length. It is quite sensitive to positioning and requires a fixed mic / source or a skilled boom operator since moving the mic even slightly off-axis will result in attenuation of the sound source. For very distant sounds and /or loud environments, this is often the best option. A medium shotgun works well in most situations for booming and voice pickup. A short shotgun is less directional than its longer siblings but often useful where length must be minimized; it still provides better rejection of off-axis high frequencies than a hypercardioid microphone would. Of course, the

Shure A8oU "double barrel" U-adapter also can be used in these situations as it minimizes total length by placing the preamp below the tube.

The quality of rejection is as important as the degree of rejection. Even a highly directional shotgun will admit off-axis sound at certain frequencies. When this audio is colored by comb-filtering artifacts, your end result will be affected.

Most shotgun mics are reasonably good at capturing on-axis audio, but for the best shotgun, it's important to look for low-self noise and high sensitivity in conjunction with a natural on-axis sound and uniform off-axis rejection. This will ensure the best audio overall.

Matthew Koschak

Matthew Koschak received a BS in Physics with an Emphasis in Acoustics from Northern Illinois University. He joined Shure as an acoustical engineer in 2006 and was a member of the team that developed the VP89 series of microphones and the VP83 camera-mounted shotgun microphone. He plays drums in rock bands and enjoys building and flying experimental aircraft.

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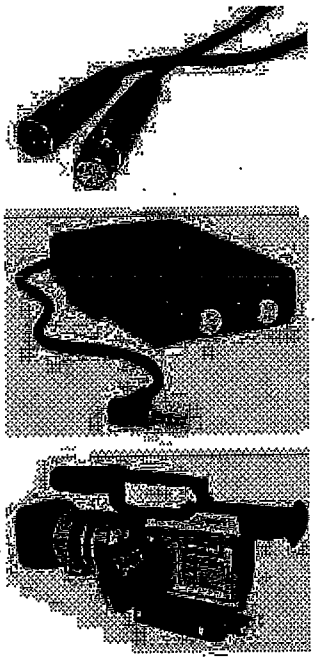
Recording Good Sound For Film and Video

A little bit of thought and a small outlay on sound equipment can improve the look of your film

By Rebort

Reading about Hollywood editor Walter Murch's experiences of recording and editing sound (see last week's column), really brought home the point that good audio can make a world of difference to any movie project, whatever the scale.



Pro XLR cables (top), a BeachTek DXA-6 audio adaptor (middle), the DXA-6 attached to a DV camera

I knew this before, but now I really know it. As a friend of mine, David Hechenberger, who works as a sound recordist at Location Sound in Vancouver, often points out, "Getting good sound is one of the most affordable things that you can do to *up* your production values and make your movie look better". Meanwhile, a bad soundtrack blares "amateur".

If sound is half the movie, then why is it often ignored and treated as the poor cousin to video?

The obvious answer is film and videomakers aren't always using their ears. If you can listen to what you are recording through a good set of headphones, which offer some isolation from background noise, you will hear the thinness of peoples' voices because the mic is too far away, or the noise of the television drowning out dialogue or your fingers thumping off the microphone as you fiddle with the controls.

You can blame camcorder manufacturers for supplying poor microphones and crap sound inputs on all but the most high-end prosumer DV cameras, but there are also simple steps you can take to improve the sound you record.

A standard piece of advice given to new filmmakers, is to get at least another microphone other than the on-board mic supplied with your camera. The microphone that comes with most consumer and prosumer range of cameras are omni-directional mics, meaning that they record from all directions, which is fine for ambient sound like the singing of birds in the forest or hub-bub of a crowd, but not if you want to pick out more directional audio like somebody being interviewed beside a busy

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road. In this instance, unless the camera goes right up close, the interviewee is likely to be drowned out by traffic.

On-board omni mics also have a tendency, at least among lower-end cameras, to pick up the mechanical sounds of the camera running, like the zoom motor and even the sound of the cameraman's heavy-breathing in those quiet video moments.

What mic?

Choosing a microphone depends on the situation you are using it for. A lapel or lavalier mic (starting from around Â£30 for the bargain-basement Hama LM09 to much more) is good for interviews and one-on-ones. These are typically omni-directional, but give a real sense of being up close and intimate with the subject. A purist like Dave reckons that cheaper ones can cut out too much of the ambient sound and "air" creating more claustrophobic results. They also are sensitive to wind noise and the rustle of clothing if not clipped on well to the subject.

Another option is a dynamic (no batteries required) handheld reporter's mic made by the likes of Electrovoice which is good again for interview work, although the mic will usually be in shot. You could use this in combination with a MiniDisc recorder to capture the audio of a speech at close range while setting up the camera at the back of a room for a long shot. These mics are around Â£100-plus and durable ("they last for years"). Dave reckons they're an essential component of your sound kit, for back-up if nothing else, although avoid buying a rock 'n' roll mike, like the Shure SM58, for this kind of interview work, he warns.

Dave likes gun mics, the signature of documentary-maker Nick Broomfield. These offer much more directional control, picking up sound in a cone-area of about 50 degrees in front of the camera. This is excellent for an interview where you are dealing with background noise that you can't get rid of (like traffic) or recording sound effects. Bear in mind that you will need a foam or furry windshield to protect the mic from handling and wind noise.

Since good sound invariably relies on you getting up close, you should also consider using a boom, especially if you plan on covering group interviews or action scenes. There is more to handling a boom than just having strong arms to hold your mic on a pole for long periods. The boom-handler has to be able to roll the boom toward the action without creating handling noise, be careful not to cast shadows or get the mic in shot and must be in synch with the cameraman as he changes shots. Headphones with a long extension are essential for manoeuvrability.

The final option is wireless mic, which consists of usually a lapel mic and match box size transmitter and a receiver that goes on the camera hot shoe. These are allow you to put some distance between yourself and the subject. You could use it for that speech I was talking about, or fly-on-the-wall reportage where the subjects often forget they are miked up it's so unobtrusive.

I should say I've had mixed results with these: the first time I used a pro mic I found it hissed and squelched so much the audio was unusable. It may have been a low battery problem - these things need a steady supply of juice. I've also used cheaper Azden wireless mics which were great in

controlled environments, but not so good in a busy city environment where the receiver started picking up messages from passing taxi drivers using the same frequency. If I can, I prefer other to use other solutions to wireless mics. "Wireless is not as natural sounding - you have to work harder," adds Dave.

Working with a soundman

By now you are probably realising that if you are just a one-man band then it's going to be harder to get great sound. It's not unknown for camera people to handle both a boom and a camera, but it's tough trying to do two things at the same time.

If you've only got one chance to get that footage then it's safer to work with another pair of ears and hands. A good soundperson will be concentrating on not only getting a clean audio take with every shot, but will also be aware of acoustics, ambient sound, interference (like a plane flying over) and recording sound effects that the cameraman might miss.

Another consideration is what do you record to - camera or a separate recording device like DAT or, if you are on a budget, the Sony MiniDisc recorder? The recordings on the MiniDisc are slightly under 16-bit, so there is a small quality pay-off compared to the digital stereo sound of DAT or new cameras.

Recording sound on a separate audio recorder gives you more control at the recording stage of the process. "A separate recording system is almost always better than a camera. Because in a camera the video heads are close to the sound heads the specs are never as good in the real world as they are on paper, although they are good enough as they're used every day," says Dave.

Filmmakers who have their own DV editing system then synch the audio and video at the editing process.

"Hard drive space has just become so affordable that some people are just tending to digitise everything and then picking up what they need," says Dave, citing a recent DV travel documentary where the filmmakers used MiniDisc extensively to capture sound after the method worked well on a previous assignment.

You will probably be editing with at least two layers of audio - one ambient and one for dialogue - and possibly adding other audio tracks for sound effects or music. The cleaner the audio, the better for mixing, whatever the source of the recording is.

"Kids' Plugs"

One of the big drawbacks with many consumer and even prosumer cameras is they lack balanced audio connectors. They use a 3.5mm stereo jack input while pro microphones typically require more sturdy 3-pin XLR inputs.

The solution? Either you get an expensive camera like the Sony PD170 that includes XLR audio inputs or you invest a couple of hundred pounds or so in an audio adaptor from a company like BeachTek. You could get handy with a soldering iron and change the plugs on the mics yourself,

but not only are mini-jack plugs unbalanced, but the plugs deteriorate and connections loosen more easily with use.

"These 'kids plugs' are a real liability, especially if you are going to be using them day in and day out," says Dave.

BeachTek's line of adaptors are attached to the tripod mount underneath your camera (see image at beginning of the page) and once you've hooked one up to the mini-plug input in your camera it takes over as the audio interface.

With a balanced input you can run a longer length of cable with less noise on the line either from your camera or even MiniDisc. The channels on the BeachTek can also supply phantom power, an industry standard 48-volt power supply, to condenser microphones which require an external power source.

"A BeachTek will have a much longer life than a camera will. In fact the good news with sound equipment in general is that you are good for ten or fifteen years. It wont easily become obsolete," says Dave.

Conclusion

If you got to this stage in the article then you are probably pretty serious about getting the sound right. Finding the right microphone for the right situation is going to be most important, which may also require getting an audio adapter and even colloborating with a sound person. "Don't try and find the magic bullet that does everything. People get very upset when the machine doesn't work the way they want it to..." says Dave.

He also recommends testing your equipment in the field as much as possible before and after buying. "People that are successful do tests." Can't argue with that.

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