“Audio and Video Cables: Does Quality Matter?”

Ralph Graves, one of the blog editors for Crutchfield, recently wrote this article.

“Whether you're a hardcore gearhead or you just bought your first home theater system, you want to get the most out of your audio/video equipment. Poorly made cables can allow noise and interference to compromise the signals coming from your source components, resulting in a subpar listening or viewing experience.

If you owned a high-performance sports car, you wouldn't outfit it with low-end tires — you'd get insufficient traction, poor handling, and increased road noise. You'd lose all the benefits of buying a high-performance car in the first place. In the same way, low-quality cables can rob you of the performance you paid for when you bought your system.

Many A/V components don't include all the cables you need; some may include a cable whose length isn't right for your setup. And, when cables are included, they're always low-quality. Replace those free "in-the-box" cables with higher-quality ones, and enjoy more realistic sound and a clearer picture.

Anatomy of a cable

There are three main parts of a cable which affect signal quality: the conductor, the shielding, and the connector. The conductor is the part of the cable through which the signal actually passes. Since the conductor is basically a wire which can act as an antenna to receive radio frequency interference (RFI) and electromagnetic interference (EMI), a good cable also includes some kind of shielding, to filter out these potential sources of noise. The connector is the part of the cable that actually comes into contact with your gear; types of connectors include RCA, S-video, and F-type.

Audio interconnects

Most good audio cables contain an oxygen-free copper (OFC) conductor, which passes signals accurately with minimal signal loss. Many cables also include two separate shields — one made of braided copper, to guard against RFI, and one made of foil, to guard against EMI — so that no annoying buzzes or "pops" are introduced into the signal.

In many cables, the shield is grounded only on the end that connects to the audio or video source, so that interference will drain away from the destination end of the cable. Cables of this type often have directional arrows printed on their jackets, and should be hooked up with the arrow pointing away from the source.

Connectors are extremely important to cable quality. Good RCA connectors provide constant, high-pressure contact with your components' jacks, and are usually gold-

plated to prevent corrosion. This results in high-quality signal transfer that won't cut out intermittently or degrade over time.

Some manufacturers offer several different levels of cable quality; how do you pick the level that's right for your system? If you've noticed lots of interference in your picture or sound, or if you're running cable over a relatively long distance, look for the best shielding you can afford. (However, if you find you need an audio interconnect longer than 30 feet, you'll get better results by running longer speaker cable instead, and moving your components closer to one another.)

Digital audio interconnects

A special subset of audio interconnects is digital audio cables. There are two types: optical and coaxial.

Optical cables transmit digital audio signals as pulses of light. Toslink connectors — the connector type found on most optical cables — are often found on CD and DVD players, as well as home theater receivers. Some portable players (such as most MiniDisc and some CD portables) are equipped with mini-optical jacks. To connect a standard-sized component to a portable's mini-optical input (for recording to MiniDisc, for example), you'll need a special Toslink-to-mini-optical cable. To connect a CD portable's mini-optical output to an MD portable's mini-optical input, you'll need an optical cable with mini connectors on both ends.

Because they use pulses of light rather than electrical impulses to transmit audio signals, optical cables are virtually impervious to interference. It's still important to look for a well-made cable, however: a quality fiber-optic element can prevent jitter, while solidly built connectors add durability.

Coaxial digital cables look on the surface like standard analog RCA cables; however, you should avoid using a standard audio interconnect to transfer a coaxial digital signal. Cables engineered specifically to pass a digital signal provide 75-ohm impedance and wider frequency bandwidth, ensuring superior signal transfer.
Common video interconnects

Video signals can travel over many different types of cabling, but the majority of video components are equipped with at least one of the following four types of jacks (listed in order from lowest-quality signal transfer to highest):

- coaxial RF, also known as F-type
- composite video, also known as RCA
- S-video
- component video

Used for connecting antennas, cable boxes, VCRs, TVs and more, coaxial RF cable (not to be confused with coaxial digital audio cable, above) can carry video and stereo

audio information simultaneously. Standard coaxial cable is stamped "RG-59"; higher-quality "RG-6" cable features lower signal loss and better shielding, both of which are essential for DBS satellite systems and longer cable runs.

Composite cables plug into the composite video jacks found on many kinds of A/V components, including DVD players, VCRs, receivers, and DBS satellite systems. These jacks are often marked in yellow, and grouped with corresponding red and white stereo audio jacks. Composite video cables use standard RCA-type connectors, and are designed for high-quality video signal transfer.

S-video cables feature round, 4-pin connectors, and transmit the chrominance (color) and luminance (brightness) portions of a video signal along different paths. As a result, they provide better color accuracy and detail than either RF or composite connections do.

Found on most DVD players and HDTV tuners, and on a growing number of TVs and A/V receivers, component video connections deliver better detail and color accuracy than you get with RF, composite, or S-video. They do this by splitting the video signal into three parts, with each part transmitted via its own cable. Unlike the other three types of connections, component video is capable of passing high-definition and progressive-scan video signals.

Because of their higher frequencies, video signals are more susceptible to degradation than audio signals are, particularly while traveling through a substandard conductor. And, as with audio, radio frequency and electromagnetic interference can taint the signal. This can cause lines, snow, and other artifacts to appear on your TV screen. A higher-quality cable with a copper conductor, 75-ohm impedance, and double shielding can effectively preserve the strength and accuracy of the original signal.

Digital video interconnects

A digital video connection will give you the best picture quality when you're hooking up a high-quality digital source, like a high-def cable box or Blu-ray player, to your HDTV.

Today, your main digital video connection option is HDMI.

HDMI (High-Definition Multimedia Interface) cables permit the video signal to remain in digital form all the way to the screen, so you avoid the slight picture degradation that can come with translating the signal from digital to analog, and back. HDMI cables can carry standard-definition and high-definition digital video signals, as well as 2 to 8 discrete channels of digital audio, depending on the capabilities of the source component.

Most HDTV tuners, HD-ready TVs, DVD players, and Blu-ray Disc™ players now come with at least one HDMI terminal. HDMI cables are also backwards-compatible with the older digital video connection: DVI. You can use an HDMI-to-DVI adapter to connect an

older component with a DVI terminal to a newer one with an HDMI terminal, but be aware that DVI is video-only — you won't be able to take advantage of HDMI's audio capabilities. For more information on what HDMI can do, check out our article on the ins and outs of HDMI.

Specialty cables/Gaming cables

We recommend using an HDMI cable with the Playstation ® 3 or Xbox 360™ if you want to get the best high-def picture. It'll also be your only option if you want to watch Blu-ray movies on the PS3 in high-definition, since you won't be able to get a true high-def picture from the component video connection. If your TV doesn't have an HDMI input, or if you're working with a console that doesn't have HDMI, you'll need to get a special game cable that's compatible with the console's proprietary video output. You should still choose the highest quality connection your TV can accept, preferably component video.

Camcorder cables

Most camcorders simply use a mini USB-to-USB cable to transfer footage to your computer and an A/V cable to connect your camcorder to your TV, and come with these cables in the box. But if you have a newer camcorder that records footage in high-definition, then you'll probably want a mini HDMI-to-HDMI cable in order to watch your footage on your HDTV. However, if you've already got an older model digital camcorder or you're thinking about buying a mini DV or Digital8 cam, you'll probably need an i.LINK™ cable if you want to hook your cam up to your computer for editing. You can check out our full selection of camcorder cables here.

Cable connection tips

Follow these general rules of thumb to get the best results from your cables:

- Safety first — especially with in-wall cables. Make sure any wire you're putting behind a wall is UL-rated for that purpose. In most cases you'll need a cable labeled CL2 or CL3. Underwriters Laboratories (UL) certification means the cable meets fire safety standards for in-wall installation. Also make sure your equipment is turned off before connecting the cable. See our guide to in-wall wiring for more helpful information.
- Avoid long cable runs if possible — the shorter the cable, the better.
- That said, make sure your cables are long enough, especially if your components are shelved in such a way that the rear panels are difficult to access. There should be enough slack to let you pull the component forward and reach the rear panel.
- Because they can introduce interference into the signal, try to keep power cords away from signal cords. If this isn't possible, at least try to minimize contact between the two.

- If an interconnect (cable) has arrows printed on its jacket, hook it up so that the arrow is pointing away from the signal source, and toward the destination.
- Avoid kinking or bending cable. Don't try to make a short cable reach — it can put stress on the connector and potentially cause damage. Buy a longer cable, if necessary. (This is especially important for optical interconnects.)
- Don't keep excess cable lying in loops. Arrange it in an "S" shape or a figure-eight instead; this can help minimize electromagnetic interference."