

ABOUT DISTORTION AND LOSS

Properly designed audio and video cables have a lot in common, but there are several important differences. Ever since electricity was discovered, the ongoing challenge for wire has always been to minimize "loss." The wire and cable industry has rarely used the term "distortion." However, home audio cables do not suffer loss, but they do cause a lot of distortion. During the 1970s, the audio industry woke up and started manufacturing low distortion cables. In contrast, the category of wide bandwidth cables needed for video has always been carefully engineered ... at least they were designed to minimize loss.

In a world where "loss" is the enemy, good cable design means the least expensive construction which keeps loss to an acceptable level for a given application. This is not at all the same as designing a cable for the least distortion. However, a wide bandwidth cable designed to have absolutely minimum loss over long lengths will also have less distortion at any length. This is the foundation of all AudioQuest/CinemaQuest cables ... taking advantage of existing state-of-the-art wide bandwidth cable design, materials and techniques, and then using this foundation as our starting point.

Consistency is the most universally acknowledged variable in wideband cable construction. Constant impedance over length is especially crucial at high frequencies. As initially manufactured, and then also when bent while in use, the electrical relationship between the center conductor and the shield must always be uniform. This requires insulating materials which have uniform electrical values and which are mechanically stable enough to ensure a fixed and unvarying internal construction. These materials must then be applied in the manufacturing process with exceedingly tight quality control and constant real time verification. The **Hard Cell Foam (HCF)** used in all of CQ's wideband cables, is stronger, more consistent, and absorbs less than other materials.

Impedance matching is important in two quite different ways: Signal loss in a long cable and distortion due to multiple reflections. Cable from a satellite dish or antenna is often long enough to cause significant loss. With cables longer than a quarter wavelength, a 75Ω matched transmission line (75Ω output, plugs, cable, input) greatly reduces loss.

audioquest
CinemaQuest

8710 Research Drive
Irvine, CA 92618
Tel: 949.585.0111
Fax: 949.585.0333
Email: info@audioquest.com
www.audioquest.com
2481-03056

audioquest
CinemaQuest



**VIDEO, DIGITAL,
CUSTOM CABLES**

AUDIOQUEST AND CINEMAQUEST



Back in 1978, when I started building custom cables for my little audio shop, hi-fi, stereo and audio shops sold music systems; appliance stores sold TVs. Two years later when I founded AudioQuest, audio completely described my world. However,


1980 was also when the new worlds of home theater and multi-room were being established. These were also audio businesses, but the culture of each was very different. It was almost 1990 before audio alone and audio with video merged into a single industry.

Today's better audio/video stores and installers take as much care in fine tuning the performance of a video display as dealers once spent optimizing the performance of a state-of-the-art turntable. In both the audio and video environments, everything matters. It was completely natural that by the late 80's I was also designing and manufacturing "high-fidelity" video cables.

In 1998 we introduced the name "CinemaQuest" as a way of declaring that AudioQuest's range of video, RF, and digital cables are not just warmed-over audio constructions. They are very specifically designed and manufactured to optimize performance for the many delicate signals that require wide bandwidth cable.

During AudioQuest's twenty-four years, I have continually refined and improved our audio, video and digital cables, always reducing distortion. Each new model has always offered better performance for less money. Each improvement came on top of the solid foundation set by the previous models. No new technique or technology replaced some previous mistake. Instead, the innovations and superior materials allowed us to climb further up the same mountain, using all the previous models as the "base camp." Perfection remains the impossible goal at the summit, but we keep getting closer.

I always try to make the most conscious and informed design and material choices; always working to make the AudioQuest/CinemaQuest ranges of cable honest and neutral ... musically and visually faithful.

William E. Low 

ABOUT DISTORTION AND LOSS CONTINUED FROM PANEL 2

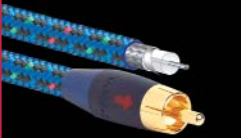




































However, within a home audio/video system, the lengths are too short to cause relevant loss, which is why most video equipment manufacturers do not even allow for the possibility of a matched transmission line.

There are no such things as 75Ω RCA or DB-15 plugs. The jacks are not 75Ω (despite some cable manufacturer's claims). From the perspective of "loss," this is not a problem. However, impedance-mismatch caused reflections do cause distortion, which is a visible problem no matter how short the run. Whenever there is any variation in impedance, there is a reflection. If this reflection were simply lost, it would not be a problem. However, a portion of the reflection is reflected again, now becoming distortion. An audio analogy is the honky sound often associated with an inferior horn loudspeaker. Simply putting your hands around your mouth while talking shows this effect. The air inside the horn (between your hands) has a different (mechanical) impedance than the air outside the horn. This causes reflections at the interface, resulting in distortion.

What can a cable manufacturer do about hardware mismatches? Nothing. But we can avoid adding to the problem by making cable with no internal impedance variation. By the way, if you see advertising stating that reflections cause "ghosting," you know you're reading BS. Video reflections no more cause ghosting than a horn loudspeakers causes echoes.

In the audio world, skin-effect is a common source of distortion. In the wideband world, it is a major cause of loss. At higher frequencies, almost all of the current is carried at the surface of a conductor. At any frequency, the only area with 100% concentration of both current density inside the conductor, and magnetic field density outside, is at the conductor's surface. This makes the surface the most critical part of a conductor. This phenomenon actually can be used to an advantage. It means that (in a wideband application) much of the high performance advantage of solid silver can be enjoyed at a fraction of the price by using a silver-plated solid copper conductor. What is inside still does matter. CQ does not use silver-plated copperweld (copper over steel).

Silver-plated copper is too important and too cost-effective not to use in any video cable worth paying for. Even CinemaQuest's least expensive video cables are silver-plated.

	Model	Geometry	Materials	Plug Options	Special Features	Jacket
Video / Digital Audio (S/P DIF)	VDM-A		1.25% SP-LGC, Hard Cell Foam	RCA		
	VDM-X		1.25% SP-LGC, Hard Cell Foam	RCA, F	Silver-Plated Shield	
	VDM-1		2.5% SP-LGC, Hard Cell Foam	RCA, BNC, F	Silver-Plated Shield	
	VDM-3		6.1% SP-LGC, Hard Cell Foam	RCA, BNC, F	Silver-Plated Shield	
	VDM-5		100% PSS, Hard Cell Foam	RCA, BNC, F	Silver-Plated Shield	
S-Video	S-A		1.25% SP-LGC, Hard Cell Foam	S (4 pin DIN)		
	S-G		1.25% SP-LGC, Hard Cell Foam	S (4 pin DIN)		
	S-X		1.25% SP-LGC, Hard Cell Foam	S (4 pin DIN)	Silver-Plated Shield	
	S-1		2.5% SP-LGC, Hard Cell Foam	S (4 pin DIN)	Silver-Plated Shield	
	S-3		6.1% SP-LGC, Hard Cell Foam	S (4 pin DIN)	Silver-Plated Shield	
	S-5		100% PSS, Hard Cell Foam	S (4 pin DIN)	Silver-Plated Shield	
COMPONENT	YIQ-A		1.25% SP-LGC, Hard Cell Foam	RCA		
	YIQ-G		1.25% SP-LGC, Hard Cell Foam	RCA		
	YIQ-X		1.25% SP-LGC, Hard Cell Foam	RCA	Silver-Plated Shield	
	YIQ-1		2.5% SP-LGC, Hard Cell Foam	RCA, BNC, DB-15	Silver-Plated Shield, UL/CL-3	
	YIQ-3		6.1% SP-LGC, Hard Cell Foam	RCA, BNC, DB-15	Silver-Plated Shield	
	YIQ-5		100% PSS, Hard Cell Foam	RCA, BNC, DB-15	Silver-Plated Shield	
DVI	DV-1	Digital Video Interface	2.5% SP-LGC, Solid PE	DVI-D	Critical Twist Geometry, UL/CL-3	
Digital Audio	HAWKEYE		100% PSS, Welded	RCA	24v DBS, SP/Conductive PVC Shield	
	EAGLE EYE		100% PSS, Welded SP-FPC	RCA	48v DBS, SP/Conductive PVC Shield	
	RAVEN		100% PSS, Direct-Silver FPC	XLR	48v DBS, 110Ω AES/EBU	
OPTICAL	OPTILINK-A		Polymer Fiber	Toslink	Extremely Fine Polish, Brass Ferrule	
	OPTILINK-G		-2.0/meter, Polymer Fiber	Toslink	Extremely Fine Polish, Brass Ferrule	
	OPTILINK-1		-1.6/meter, Polymer Fiber	Toslink	Extremely Fine Polish, Brass Ferrule	
	OPTILINK-3		217 Polymer Fibers	Toslink	Extremely Fine Polish, Brass Ferrule	
	OPTILINK-5		65 Quartz Glass Fibers	Toslink	Extremely Fine Polish, Brass Ferrule	
CUSTOM Audio/Video	ICA-1		Long-Grain Copper, HCF	Bulk Only	UL/CL-3	
	ICA-2		Perfect-Surface Copper, HCF	Bulk Only	UL/CL-3	
	ICA-3		Perfect-Surface Copper+, HCF	Bulk Only	UL/CL-3	
	VSD-X		1.25% SP-LGC, Hard Cell Foam	Bulk Only	Silver-Plated Shield, UL/CL-3	
	VSD-1		2.5% SP-LGC, Hard Cell Foam	Bulk Only	Silver-Plated Shield, UL/CL-3	
	VSD-3		6.1% SP-LGC, Hard Cell Foam	Bulk Only	Silver-Plated Shield, UL/CL-3	
	VSD-5		100% PSS, Hard Cell Foam	Bulk Only	Silver-Plated Shield, UL/CL-3	

Plugs

DB-15

DVI-D
Solderless Connector for VSD and ICA. Available in red, green, blue, white and yellow.

RCA
Solderless Connector for VSD. Available in red, green, blue, white and yellow.

BNC
Solderless Connector for VSD. Available in blue and yellow.

F

ABOUT DISTORTION AND LOSS CONTINUED FROM PANEL 3

The wonderful low-distortion wideband capability of CQ's solid **Silver-Plated Long-Grain Copper** (SP-LGC) allows even our least expensive A-Series cables to visibly outperform some much more expensive competition. For those with appropriate equipment, the higher **Solid PSS Silver** models offer verifiable ultimate performance for a fraction of the cost of any other video upgrade.

One pleasure of the video cable business is the ability to easily and objectively evaluate and prove a cable's performance. Audio (sound) is a transitory ephemeral experience which makes a fair objective evaluation quite challenging. In the video arena, test patterns make it easy to objectively evaluate all aspects of video performance, including cables. Just one look is all it takes.

LENGTH

We do not specify a maximum length for optimum performance as this measurement depends on the application. However, all CinemaQuest cables have exceptionally low loss. For many years our standard trade-show demonstration pits a 45 meter (150 feet) CinemaQuest S-1 cable against a one meter S-Video cable from any competitor. We love the appreciative amazement.

CONDUCTING MATERIALS

SP-LGC – At high frequencies (video, RF, digital), almost all current is carried at a conductor's surface. The surface material and finish dominates the characteristics of the conductor. AQ's selected Silver-Plated Long-Grain Copper provides exceptional performance by putting the money at the surface, where it counts the most. Increasing the thickness of the silver plate also provides for a verifiable improvement in high frequency performance. AQ offers three SP-LGC options....1.25%, 2.5% and 6.1%.

PSS – Perfect-Surface technology is a proprietary manufacturing process that yields a significantly smoother and less contaminated surface. Through this process, exceptionally high purity solid silver is turned into CQ's Perfect-Surface Silver. No matter how perfect the surface, there is also an advantage to having the same quality uniformly throughout the conductor.

INSULATION

CinemaQuest's 75Ω cables use **Hard Cell Foam** (HCF), a hard nitrogen-injected microcellular extrusion. The reason for any foam is to reduce the amount of material near a conductor. Less solid material means less loss and less distortion. Compared to other foams, HCF has a much more uniform structure (consistency), better dielectric properties (less propagation delay), and better mechanical stability (maintains constant impedance).