

Testimony of

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June 21, 2006

TESTIMONY OF CHRIS COOKSON
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BEFORE THE
UNITED STATES SENATE
COMMITTEE ON THE JUDICIARY

THE ANALOG HOLE: CAN CONGRESS PROTECT COPYRIGHT AND PROMOTE INNOVATION?

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Introduction

Chairman Specter and Ranking Member Leahy, thank you for inviting me to testify today. My name is Chris Cookson and I am the Chief Technology Officer of Warner Bros. In 2002, Mr. Richard Parsons, now Chairman of Time Warner, testified before this Committee and identified three challenges facing the audiovisual industry in its transition from the analog to the digital world that could not be addressed purely in the marketplace, but would require some sort of government intervention. Those three issues were the problem of protecting unencrypted digital broadcasts, the explosion of peer-to-peer piracy, and the analog hole.

The first issue was taken up by the FCC in its Broadcast Flag rulemaking procedure and is now being addressed in the legislative process.

The second issue, peer-to-peer piracy, was examined by the Supreme Court in the Grokster decision of 2005 wherein providers of peer-to-peer services that induced massive amounts of copyright infringement were held liable. As a result of the Grokster ruling, more and more audiovisual content is being made available legitimately over the Internet and new licenses between studios and Internet distributors are being announced almost weekly. For example, Warner Bros. recently announced an agreement with BitTorrent to sell downloads and video-on-demand streams of our films using BitTorrent's peer-to-peer technology.

The third issue remains unresolved and is the subject of today's hearing: the analog hole. Mr. Glickman and, four years ago, Mr. Parsons described the crux of the analog hole problem. It stems from the fact that we all have old analog TVs. When we receive digital audiovisual content, if we are to be able to see it, it has to be converted into an old-fashioned analog signal that our TV can understand. When this happens, the digital technologies that protect that content from unauthorized copying and redistribution are lost. In my testimony I will try to concentrate on the practical aspects of maintaining consumer choice and facilitating the digital transition.

Today--In the Middle of Digital Transition

We are transitioning from the Analog world in which we've been living, to a new all Digital world. That Analog world had order and structure to define and delineate our choices in making use of audiovisual content. For example, you could rent a tape and take it back, or if you kept it, you knew you would pay more. You could decide.

Unauthorized copies degraded badly and re-transmission wasn't readily possible.

A new fully Digital world will also allow distinction between consumer choices. Based on how the consumer wants to use content, and the terms under which that content is offered, technologies like encryption can be used to protect and authorize the experience selected. For example, you can choose to watch a movie once, have it to watch for a week, or keep a copy in a personal library, and so on. You, the consumer, can decide.

This Digital world also allows unsecured content to be copied and transmitted easily, quickly inexpensively and endlessly. Without loss of quality.

Today we're in the middle of the transition from the Analog world to the fully Digital world. More and more often, content is delivered digitally, but since most of us still have those analog TVs, digital content is de-scrambled and turned into analog so that we can see it. When that happens, all the distinctions between the offers we might have chosen are lost. The content can easily be re-digitized, resulting in a nearly perfect file that can be copied endlessly and re-transmitted anywhere.

The risk is that we'll become mired in this transition. With all digitally connected products, a consumer is given guidance to stay within the rights he or she acquired - so that the answer to "can I copy?" sometimes is "no." Manufacturers can increasingly avoid these content use choices and guidelines by bringing new products to the market that allow any use of content, whether agreed or not, simply and without asking - by digitizing that analog output. In this environment, consumers will be increasingly confused about "rights" and may come to regard devices that digitize analog as the "more flexible" product rather than all digital products that abide by content consumption choice guidelines. If this happens, the digital transition will be impeded.

Consumer Choice

Consumers need and deserve a clear understanding of the terms of an offer they can accept and the bounds of the functionalities they will receive. We expect that most consumers will respect copyrights when:

- ? the content offer is perceived as fair and a good value,
- ? the content offer is easy to use,
- ? the quality of service meets the consumer's needs and expectations,
- ? the outlines of the agreed uses are understandable and clearly conveyed, and
- ? an attempted use that crosses the line is identified as such and is not readily fulfilled.

As content producers, our job is to figure out how to make appealing, fair, understandable, quality choices available to consumers. Our goal is to offer our content in as many legitimate ways as possible so that the consumer can choose when, where and how to enjoy it. Thus, we offer our films in theaters, on DVD, on pay-per-view and video-on-demand services, via Internet delivered electronic sale and rental, and on pay and ultimately advertiser-supported free television.

It is in our business interest to make our content available to consumers in ways that consumers will find attractive. And we are constantly looking for new and innovative ways to distribute our content to consumers. But to do that effectively, we must have the means of delineating and maintaining the distinctions among the various offers. For instance, if a consumer wants to pay a lower price to view one of our films once, rather than own a permanent copy, we need to have the means to ensure that the "view once" option isn't readily subject to copying.

Today's new digital products with analog inputs can completely blur the lines of understanding, making it confusing for consumers.

- ? Should it cost more to buy a copy of a movie for my library than to simply watch it once?
 - ? If I can put a copy in my library by recording a pay-per-view movie from the analog output of my cable set-top-box, am I foolish to buy a copy?
 - ? Am I doing anything wrong if I'm just using normal consumer electronic and computer equipment the way it was designed and sold?
 - ? If paying the pay-per-view price gives me a copy, can I pay less if I REALLY only watch it?
- Consumers lose if there is no way to distinguish between uses.

Until we address the threat of losses from digital piracy of works that have lost their protections via the analog hole, content owners will have difficulty making new consumer offerings and choices available.

Respect for Copyright

Technical protections for digital content can be defeated in two ways: (i) circumvention and (ii) the analog hole. When a person chooses to circumvent the technical protections on a digital work, he or she must make use of a circumvention device, such as the De-CSS software that defeats the encryption protection of DVDs. This act of circumvention is conscious and willful. And the Digital Millennium Copyright Act ("DMCA") clearly defines both the act of circumvention and circumvention devices as illegal.

The analog hole is very different from circumvention, even though the result --unauthorized appropriation of the content and digital piracy--is the same. With the analog hole, no illegal circumvention devices or circumvention activity is involved. Rather, a person uses perfectly legitimate equipment hooked up in a perfectly legitimate manner that seamlessly permits unauthorized copying and redistribution of copyrighted content.

For example, if a person plugs the analog output of their DVD player into the analog input of a DVD recorder, that DVD recorder then can digitize the analog content and make multiple perfect digital copies onto recordable discs. The same holds true if the analog output of a DVD player is plugged into the analog input of a video capture card or USB dongle for a personal computer. Although the copyrighted content of the DVD disc was scrambled and protected, this protection is lost when the content is converted into analog in the clear. The analog output of a DVD player does not, and cannot, "know" whether it has been plugged into your analog television set for legitimate playing and viewing or is being plugged into a recorder or PC for unauthorized re-digitization, copying and retransmission.

What is particularly insidious then about the analog hole is that it facilitates unauthorized copying and redistribution without the involvement of any illegal circumvention devices or any overt act of circumvention. Or more importantly, without the consumer clearly knowing or understanding that he or she has done anything wrong. While the unauthorized copying, distribution and/or retransmission of copyrighted content violates copyright laws, consumers are not given any concrete guidance or boundaries to avoid this activity because the analog hole so readily facilitates the copying and redistribution through the use of legitimate equipment available in any consumer electronics store or shopping mall.

Facilitating the Digital Transition

Beginning about ten years ago, the consumer electronics, computer and motion picture industries began meeting in a forum open to the public and all interested attendees to determine how technology can be used to bring digital content offerings to the market and protect such content from unauthorized copying and redistribution. This Content Protection Technical Working Group (CPTWG) has held nearly 100 sessions of this forum to explore how technology can be used as the basis for voluntary agreements to distinguish among various offers and uses of content and to protect digital content from unauthorized use. Several voluntary agreements have resulted from the work of the forum. They include agreements to deliver digital content to the home on DVD discs using the Content Scramble System (CSS), to deliver digital content across home networks using Digital Transport Content Protection (DTCP) and to deliver high data-rate content directly to digital displays using High-bandwidth Data Content Protection (HDCP).

These various agreements are "voluntary" in the sense that a system's maker or user can choose to either ignore the content, or choose to make use of it. If consumers should choose to ignore it, the system cannot access the content since it is obscured, encrypted, and of no use. If they choose to use the content, they can accept the offered terms of use and the keys to unlock the content are provided. Their products will then, under contract, be required to abide by the terms of use for the content set forth in the license. An attempt to use the content by circumventing the protecting technology will not be allowed under the DMCA.

The touchstone for these various voluntary agreements is that the content must originate in scrambled or obscured form such that access to the content depends upon entering into the voluntary license agreement and accepting the offered terms of use in order to obtain the keys to descramble the content. Products that send and receive digital

content in this manner must have the capacity to control and authorize access to the content through authentication and decryption processes.

The problem with analog connections is that they lack the capacity of such authentication and decryption. The standards for these connections are over 50 years old. Existing analog television sets simply aren't able to decrypt or descramble content. Therefore, in order for content to be viewable on such televisions, it must be in the clear. Once protected digital content is converted into analog in the clear, there is no longer a basis on which to build a voluntary agreement that would attach conditions to the access and use of that content. No license and no decryption keys are required. Rather, any device with an analog input can get ready and unrestricted access to any analog content in the clear. And there is no contractual basis on which to attach usage rules or guidelines.

Therefore, the voluntary license and market-driven approach upon which the roll-out of digital content protection technologies is based simply doesn't work when it comes to analog signals and particularly to the problem of re-digitization of such analog signals. All three industry groups that participate in the forum recognized this inability to find a voluntary structure that would address this problem and all acknowledged the need for some sort of regulatory approach. As a result, it convened a special study group called the Analog Reconversion Discussion Group (ARDG) to examine different ways for protecting content across analog connections and addressing the problem of the ready digitization of analog signals in the clear.

During the course of the work of the ARDG, it was shown that even without a contractual obligation to do so, some manufacturers of digital devices with analog inputs do look for content usage information in analog signals and re-apply protections when the signals are digitized. No contract compels this, only a respect for the copyrights in that material. However, many other manufacturers of similar analog input digital devices choose to ignore such content usage information and sometimes even promote the ability to do things like copying DVDs. Products such as simple USB plug-in analog to digital converters and video capture cards for computers simply do not need a license or permission to capture and digitize analog video signals. The question thus arises: how long can manufacturers who choose to respect copyrighted material afford to give up market share to those competing product manufacturers who choose to exploit the ability to have their products offer uncontrolled and unrestricted copying and redistribution?

It became clear that a narrowly targeted regulatory approach is needed to level the playing field among all manufacturers so that all digital products with video analog inputs treat re-digitized copyrighted commercial content as if it had remained in digital protected form all along.

The urgency for addressing this problem is growing as devices that take advantage of the analog hole are becoming increasingly common on store shelves and the Internet. In fact, on the Internet, you could buy a "capture card" for your PC that uses the analog hole to duplicate copyrighted material for about \$25 - with a \$25 rebate - essentially for free. The more common these devices become, the less consumers will be able to distinguish what they should or should not be able to do with content they purchase. A normal consumer would naturally assume that if they can buy such a device on a store shelf from a legitimate merchant, it must be legal, right?

But how do we level the playing field so that all manufacturers treat re-digitized analog content as if it had remained digital?

Solving the Analog Hole Problem

We believe there is a good technological compromise that would allow re-digitized content to be protected as if it had stayed digital. This solution involves the integrated use of two signaling technologies:

? One is a code attached to the picture (CGMS-A) in the same manner as Closed Captioning or V-Chip information, that indicates the permitted uses of the content - for instance that no copies are allowed, or that it can be copied once, or that it has no limits on the copies that can be made.

? The second is a mark embedded in the picture itself (Rights Assertion Mark) that indicates only that a copyright is asserted and that CGMS-A should be present.

Both of these technologies are necessary to fix the analog hole. CGMS-A is not in the active picture and if it's lost, it leaves no record. It is easy to "lose" in some steps of video processing. Additionally, some analog technologies, like VGA which is intended strictly to drive displays, do not allow for CGMS-A in the signal.

The technology proposed for the Rights Assertion Mark, Veil, has been used for many years in toys and games and for tracking of television advertising. It is similar to, but much less complicated to implement than, a traditional watermark. It is much more difficult to strip out than CGMS-A and won't be accidentally "lost." It has been tested extensively and when it's embedded in a picture is invisible to the human eye at normal insertion levels.

The net effect of using both of these technologies is that consumers will get the "bright line" that they deserve. Let me be clear - these technologies are not intended to resist determined commercial pirates who want to hack through them. They are designed to provide normal consumers with a way to determine when they are crossing the line and using content in a way that was not intended. We believe that most consumers, if they know where this line is, will not cross it.

Misapprehensions

Misapprehensions about this solution have been built on misunderstandings and faulty information. It's been claimed that this approach is too broad and it will impact everything from cars and toasters to F-16s. That it will prevent timeshifting of favorite programs from HBO. Or it will banish Tivo and squash innovation. We've also heard that it is too weak and not worth doing since it could be hacked by determined hackers.

None of these are true.

The compromise solution that has evolved is focused only on those devices that recognize analog video specifically. The only need is to assure that those devices that normal consumers buy specifically to capture analog video will recognize controlled content and protect that content when sending it onward. Nothing for toasters or F-16s.

Most content will be marked for one generation of copying and allows for normal timeshifting. Only special cases such as Pay-Per-View video or packaged media like DVDs can be marked to prohibit copying.

Most Personal Video recorders like Tivo already get their content directly in digital form either from a cable or satellite operator. I love my Tivos, but what they can do is already subject to the kind of controls we are suggesting. Rather than squashing innovation, this approach only asks that innovators finish the job of considering the unintended consequences of what they create.

Finally, if the goal is to give normal consumers clear lines and information, this will be a success so long as the information isn't "accidentally" lost. Even if hackers overcome these marks, this effort will be worthwhile whenever normal consumers recognize and respect the terms of the offers they accept. If that happens, the transition from analog to digital will proceed on merit.

We need legislation in order to implement these technologies and fix the analog hole. Unfortunately, this is a problem that cannot be solved by the marketplace.

Some have suggested that a simpler solution to this problem would be legislation that imposed a mandatory sunset on analog outputs. Such a solution would prevent content from even being exposed in analog form and have the advantage of imposing no implementation cost on analog to digital converters. However, the disadvantages of this approach are numerous.

First, under this approach, television sets with only analog inputs would be unable to function with new entertainment products and devices because such new devices would lack the necessary analog connections. This would harm those consumers who can least afford to buy new digital television sets. Second, under a sunset approach, consumers would be forced to replace home entertainment equipment, such as a VHS recorder, before the end of its

useful life with new equipment since it wouldn't work with newer devices that were subject to the sunset and had no analog outputs. Third, a sunset would not impose any restrictions on analog to digital converters. Thus, as long as any legacy products with analog outputs remained in consumers' homes, the analog hole problem would persist. Additionally, to be effective, literally thousands of devices would have to come under regulation. Finally, any sunset of analog outputs is likely to be so far out in the future that it would have little remedial benefit.

In contrast, the approach of regulating only video analog to digital converters by a narrowly targeted law would ensure that existing equipment, both analog and digital, in consumers' homes would continue to function with full capability until the end of its normal service life. The breadth of products regulated under this approach would be far less than the range of products that would be affected by an analog sunset. And the approach of requiring video analog to digital converters to detect and respond to CGMS-A and the Veil Rights Assertion Mark would ensure that digital content would be treated consistently whether it got converted into analog or remained digital. In this way, consumer expectations would be clearly defined.

House Judiciary Committee Chairman Sensenbrenner and Ranking Member Conyers have introduced legislation, H.R. 4569, that will mandate the use of the CGMS-A and Veil technologies in devices that re-digitize content.

We have received support for this bill and for our technological solution from some in the high tech and consumer electronics industry. I would like to submit for the record the attached letters from IBM and Thomson. However there are others who call this bill a "tech mandate" and say that it's too burdensome to implement.

We agree that mandates on technology should be a last resort and used only when a marketplace solution cannot be found. In this situation, most in the tech industry agree that there is no marketplace solution and none has been suggested. In addition, this proposal merely selects an uniform method of signaling.. This is necessary if we are to avoid confusion from looking for messages in multiple and potentially confusing and conflicting codes. A manufacturer shouldn't have to look for a Warner Bros. code and again separately for one for Disney or Fox. The actual technologies used to protect the content can be many and varied - as many and as varied as those in the market that are and can be used to protect that same content when it is distributed in fully digital form in the first place.

Some have argued that implementing CGMS-A and Veil as a fix to the analog hole will be too costly and burdensome for the tech and CE industries to implement. They say that it could cost hundreds of millions of dollars to add in the CGMS-A and Veil technologies to their devices. Our estimates, however, place the cost at around one cent per device to implement. In addition, the fix would be implemented in devices going forward and phased in over time. And, we should remember that much of the value to consumers of these devices derives from the content, our content, that they will still be able to record.

What if the Analog Hole is Not Fixed?

In short, consumers lose. If we can't distinguish between consumer uses when analog is permitted, the most valuable content will migrate to only digital formats because they will be most protected from unauthorized use. This means that only those who invest in new systems will be able to access this content. Consumers with TVs that have only analog inputs may have to wait longer for the opportunity to see new releases. Already, new products and services are entering the market that either can or do limit real High Definition images to only those sets equipped with digitally protected inputs.

Consumer choices will be limited for those who have TVs that still depend on analog. A real "View Only" offer could only be made to consumers without the analog exposure - other offers would have to consider and factor in the possibility that a copy was being made by even average consumers.

The production and market life of analog devices will be artificially extended and the digital transition will slow.

But, if we can get this problem fixed, consumers will get many more choices - they can expect to see exciting new offerings like HD movies on pay-per-view, and so on...

Consumers would have the normal use of their analog devices for as long as the products last.

One size doesn't fit all - Consumers can expect a broader range of choices tailored to their desires. If we solve the analog hole problem and consumers do choose to re-digitize an analog video signal, they get essentially the same choice and uses of that content as if the content had stayed digital. They will have a clearer understanding of the value of the choices they make. And the value of copyright will be protected.

Digital Technologies will Win on Merit.

We believe that, on merit, digital wins. Consumers will get:

- ? More choices
- ? Better performance
- ? Better reliability
- ? At lower cost...

We believe that, with a level playing field, digital technology is a better consumer proposition. We ask your help in leveling the field