The Realities of The Retail Sale of "Navigation Devices"

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Abstract

The 1996 Telecommunications Act included SEC. 629. COMPETITIVE AVAILABILITY OF NAVIGATION DEVICES, *also called the "Bliley Amendment" after its author, Congressman Bliley. The potential of substantial hazards has been created. The danger exists that a) consumers will be confused and purchase devices that fail to meet expectations, b) the technical integrity of services will be impaired, c) reception of signals on other receivers in the home will be degraded, d) interference will be caused to other subscribers, e) signal leakage will hamper legitimate uses of the over-the-air spectrum, and f) economic waste will result.*

With adequate care, many of these hazards can be minimized and the consumer offered choices. Accomplishing this will not be easy.

INTRODUCTION

The 1996 Telecommunications Act included a section on the commercial availability of Navigation Devices. This section creates a requirement that the FCC establish rules. It is important for all involved with in-home equipment to become familiar with this section of the law and to participate in the formation of the FCC's rules. The financial and operational consequences of this law and the rules that will be issued are substantial. Subscribers will be affected in many ways. The likelihood of subscriber problems has been increased dramatically. The devil is in the details. The fine points of the FCC rules will dictate the outcome. As is often the case, Congress leaves the hard work to the regulatory agency.

Subscriber education will be more important than ever. Cable operators will have to engage in extensive information campaigns to ensure that consumers make informed choices which maximize the value of their cable subscriptions.

THE LAW

The section of the law reads as follows:

SEC. 629. COMPETITIVE AVAILABILITY OF NAVIGATION DEVICES

"(a) COMMERCIAL CONSUMER AVAILABILITY OF EQUIPMENT USED TO ACCESS SERVICES PROVIDED BY MUTICHANNEL VIDEO PROGRAMMING DISTRIBUTORS. – The Commission shall, in consultation with appropriate industry standard-setting organizations, adopt regulations to assure the commercial availability, to consumers of multichannel video programming and other services offered over multichannel video programming systems, of converter boxes, interactive communications equipment, and other equipment used by consumers to access multichannel video programming and other services offered over multichannel video programming systems, from manufacturers, retailers, and other vendors not affiliated with any multichannel video programming distributor. Such regulations shall not prohibit any multichannel video programming distributor from also offering converter boxes, interactive communications equipment, and other equipment used by consumers to access multichannel video programming and other services offered over multichannel video programming systems to consumers, if the system operator's charges to consumers for such devices and equipment are separately stated and not subsidized by charges for any such service.

"(b) PROTECTION OF SYSTEM SECURITY. – The Commission shall not prescribe regulations under subsection (a) which would jeopardize security of multichannel video programming and other services offered over multichannel video programming systems, or impede the legal rights of a provider of such services to prevent theft of services.

"(c) WAIVER – The Commission shall waive a regulation adopted under subsection (a) for a limited time upon an appropriate showing by a provider of multichannel video programming and other services offered over multichannel video programming systems, or an equipment provider, that such waiver is necessary to assist the development or introduction of a new or improved multichannel video programming or other service offered over multichannel video programming systems, technology, or products. Upon an appropriate showing, the Commission shall grant any such waiver request within 90 days of any application filed under this subsection, and such waiver shall be effective for all service providers and products in that category and for all providers of services and products.

It is not clear where the term "Navigational Devices" comes from. The impact of the law is much broader than just electronic program guides which is the usual meaning of the term. All set top boxes are included in the scope of this law.

Set Top Boxes vs. Consumer Electronics

In the past, the Consumer Electronics Industry has positioned set top boxes as evil things, the work of the devil. From their previous point of view, these nasty things get in the way of all of those wonderful TV and VCR features and functions (whether you want those capabilities or not!). They believe that the reason consumers don't use TV and VCR features and functions is not because they don't care for them, but because the evil set top box gets in the way.

Sometime in 1995, there was an apparition from heaven that told the consumer electronics industry that they were not seeing things clearly. The set top box is in fact a wonderful thing that can be sold at retail! Rather than trying to kill off set top boxes, the consumer electronics industry now wants to make and sell them. We've entered a new era.

It may be that the consumer electronics industry came to the realization that the cable set top box has nearly all of the same characteristics as a VCR when considered from the perspective of the interaction with a TV. The VCR has a tuner, power supply, remote control, and a remodulator. These elements duplicate the corresponding elements in a TV. The VCR requires the TV to be tuned to channel 3 and left there. Alternatively, both VCRs and set top boxes are available with base band video and audio outputs. Many consumers use the VCR's remote control to tune channels and the TV's remote control to adjust volume. These consumers don't miss Picture In Picture (PIP) since they've forgotten they have it. Other TV tuner features such as sleep timers are rarely used anyway. VCRs have automatic bypass switches which convey the full spectrum to the TV's tuner when the VCR is off. The same feature is available on set top boxes. The VCR is in almost every way a "set top box" which has as much interference with the features and functions of a TV as does a cable set top box. Yet almost no one complains about VCR interference with TV features!

Now that nearly all TV households have more than two TV's and most have at least two VCRs, the consumer electronics industry needs something else to sell. Since the VCR is really just one type of set top box, the expansion of this category to include other types of set top boxes is attractive.

A Cable Operator's View

Very little in life is all bad or all good. Most things have advantages and disadvantages. From a cable operators'

perspective, the advantages to subscriber ownership of set top boxes are primarily economic and potentially customer satisfaction. Certainly getting the subscriber to pay for the hardware and its maintenance is a real blessing. Also, there is a potential that the subscriber who owns the set top box will see it as a benefit rather than as something that gets in the way of TV and VCR features and functions. There is something about a pride of ownership that brings a "halo" effect.

Commercial Availability

Very clearly, the law of the land requires that the FCC make regulations, in consultation with appropriate industry standard-setting organizations, to assure the commercial availability of set top boxes for all kinds of cable services. However, it appears that the FCC is moving directly to a Notice of Proposed Rule Making (NPRM), bypassing its usual step of a Notice of Inquiry (NOI). This is very troubling since this is a very complex issue involving many affected parties. While it is true that Congress placed unreasonable demands and burdens on the FCC with the Telecommunications Act, the taking of shortcuts only increases the likelihood of serious problems later. Since Congress placed no deadlines for the FCC's completion of this difficult task, this haste seems unwarranted. Congress also did not place a deadline for the commencement of commercial availability. Clearly doing it right is more important than doing it early. The hazards of ill-conceived or inadequate rules will be with us for a long time since these navigation devices are durable goods with a decade or more of lifetime.

It isn't obvious how the FCC intends to comply with the requirement to consult with appropriate industry standard-setting organizations. Certainly, the NCTA Engineering Committee or the Society of Cable Telecommunications Engineers should be involved in any such consultation. Standard-setting organizations are experienced in the difficulties of reviewing all sides of issues and resolving them to a common position. There is no way to do this quickly. It takes time. Rushing to judgment will jeopardize the ultimate solution.

It is clear that the commercial availability of set top boxes will not limit the cable operator's right to also offer these devices. The law, as written, seems to offer the option of sale or lease by the cable operator. The important point is that the subscriber must be aware of the charges and that these charges are not subsidized by any service offerings.

Protection of System Security

Congress recognized the importance of protecting system security and the rights of service providers. There are only two ways to accomplish this. The first is to create a signal security system which is so secure that it cannot be broken. The second way is to separate out the signal security system and not allow subscribers to own and access it. In the latter case, the service provider is free to replace a breached security system without imposing financial loss on the consumer.

It is impossible to guarantee that a signal security system cannot be breached. There is no way to prove such a claim of invulnerability. The only alternative is for the entity wishing to sell the signal security system to consumers to guarantee the signal security system by placing sufficient funds in escrow to cover the full costs of recovery from a security breach. Since these costs will include the labor to replace the breached hardware as well as replacing the hardware itself, these costs are prohibitive. None the less, when cable equipment suppliers make large sales of set top boxes to cable operators, they pledge certain limited signal security

guarantees. The cable operator makes a business judgment regarding these guarantees. Then the cable operator takes on the ultimate financial responsibility for fixing a security breach or replacing the defeated equipment without direct financial loss to the consumer. The retailer wishing to sell signal security directly to the consumer must also protect the consumer against direct financial loss in the event that the security system must be replaced.

The second solution is to separate out the security element and not sell it to the consumer. The service provider retains ownership and control of the security element. In the event of a compromise of the security, the service provider replaces the security element. There are problems associated with this. The analog security systems in use at present were not designed for such a partition. Forcing the partition may result in a loss in economics, a reduction of security, and a decrease in user convenience. Adjustments in the way analog security is done will be required. This will take time.

Waiver

Service providers or equipment manufacturers may request a waiver of the rules for assuring commercial availability of new technology still in its formative stages. For example, while standards are being settled for the hardware required to deploy a new cable service, non-standardized implementations used for market research or early introduction of the service may be granted a waiver. This is important because the standard-setting process is long and complicated. If every new service had to be standardized before market trial, new services would cease to be introduced. A further disadvantage of this approach is that the benefits of market trials of different approaches would be lost. In the current approach, multiple vendors supply a variety of implementations which are tested against consumer wishes. The implementation which best fits consumer needs and desires usually wins. In the event that it is learned that the service itself has insufficient appeal to justify a launch, a great deal of time and money is saved by the market trial. In this situation, no standards are needed and those who would like to provide hardware at retail are saved the losses involved in providing for a failed service.

The FCC must respond to the request for waiver within ninety days. Any such waiver applies to all service providers and to all equipment suppliers for that type of service.

SERIOUS HAZARDS

Serious hazards arise from subscriber set top box ownership. Significant extra costs and a loss in convenience can result from direct ownership. If the consumer fully understands the trade-offs and makes an informed choice, his satisfaction should increase. If the trade-offs are not clear, frustration, anger, and financial loss will likely result.

Servicing the Hardware

An important issue is the resolution of in-home problems. Most subscribers do not realize that the leasing of a cable set top box brings with it in-home pre-paid service. This service is generously provided and covers not only technical difficulties but even assistance in usage and user errors such as not checking to see if the set top box is plugged in. The lease fee covers the costs of providing this service. This is taken for granted. It will be important to advise subscribers who purchase their set top boxes that this assistance must come from the retailer, the manufacturer, or it will be available at an extra charge when provided by the cable operator. *Clearly*

managing subscriber expectations is critical to informed consumer choice and to minimizing and properly directing subscriber frustration and anger to its appropriate source.

New Service Hurdles

A serious drawback to subscriber ownership of set top boxes comes from the hurdle this creates to taking new services. If the set top box owned by the subscriber does not have the technology to provide access to a service, the subscriber will have to choose between a) not taking the service, b) adding a second set top box to provide access to the service, and c) replacing the existing set top box with a new one that combines the old capability with the new. Lacking the technology for a service can arise from a) the service provider introducing a new service, or b) the subscriber moving from a cable system which did not offer the service to a cable system which does offer the service. Clearly this situation presents financial, convenience, and "just doing it" hurdles to subscribers who might otherwise try a new service.

Perhaps the simplest example of a technology change which impacts the consumer is the cable system's move to higher frequencies. It is reasonable to assume that over the next five to seven year, it will become technically practical to extend a cable system's upper frequency limit of 1 GHz or beyond. When this happens, a cable operator will replace the set top boxes which are leased. Those subscribers leasing the set top boxes will not be disadvantaged. However, those subscribers who have elected to purchase their set top boxes will have to make some choices and perhaps another purchase.

Launching New Services

Another aspect of this problem is that a new service needs to get subscribers quickly. If the cable operator provides the set top box, it will be installed in a large number of homes simultaneously. The service provider quickly adds subscriptions if the service is attractive. When the service provider has to rely on consumers purchasing set top boxes, there will be a significant reduction in the speed of penetration. Many service providers will not be able to survive long enough under these conditions. This raises yet another concern: what happens when a service fails? Under current conditions, a service which fails and leaves hardware useless does not directly impact subscribers. If the subscriber purchases a set top box for the new service and it then fails, the subscriber will bear the loss. Not only will this cause unhappiness, but it will further reduce subscriber willingness to try new services in the future.

Management of Expectations

While these problems are not yet upon us, the potential is high that they will be in the near future. It is worthwhile giving them some serious thought now. Probably the most important action to be taken by cable operators is subscriber education. The issue here is "management of expectations". If the consumer is well aware of the advantages and disadvantages of his purchase decision and proceeds with an informed decision, the likelihood of later problems is reduced.

It is unfortunate that the cost of advising consumers of their options will fall mostly – or even entirely -- on cable operators. This cost eventually raises the price of subscriptions. Consumers will ultimately pay for facilitating commercial opportunities for retailers.

Cable operators have the tools to make extensive and effective contact with subscribers. These tools must be utilized to minimize the problems that arise from failed expectations. Subscribers will see advertising

for set top boxes available at retail. Some of this advertising will be misleading. It will certainly de-emphasize or omit the problems associated with such purchases. The cable operator must set the record straight. The cable operator needs to provide the other information required by the subscriber for making an informed choice.

THE "CABLE READY" REQUIREMENT

The cable and consumer electronics industries have struggled for many years arriving at technical specifications for "cable ready" TVs and VCRs. This effort intensified after the 1992 Cable Act and its Leahy Amendment concerning compatibility between consumer electronics equipment and cable services. That law required the FCC to establish a technical definition for cable ready TVs and VCRs. The FCC issued a Report and Order in May of 1994 which took the first step in that direction by including partial technical specifications on RF performance of cable ready TVs and VCRs. The process will be completed when the FCC incorporates the Decoder Interface specification in its rules. That, of course, will happen after the Electronic Industries Association's (EIA) and the National Cable Television Association's (NCTA) Cable, Consumer electronics Compatibility Advisory Group (C^3AG) makes its recommendation on the Decoder Interface to the FCC.

When the definition of cable ready is complete, it must apply to set top boxes sold at retail as well. All of the long and difficult work done leading to cable ready TVs and VCRs could be undone by the retail sale of set top boxes which fail to meet the FCC's technical definition of cable ready. It is reasonable to expect that the sale of set top boxes at retail will exceed the sale of cable ready TVs and VCRs if only because the prices of these set top boxes will be lower than most TVs and some VCRs. Additionally, consumers already have multiple TVs and VCRs and are more likely to buy cable ready set top boxes at retail rather than new TVs or VCRs.

Certainly if compatibility between cable systems and TVs and VCRs really is important, than that same degree of compatibility must be important in the retail availability of set top boxes. If the latter is not true, we must question the true importance of the former.

RF Requirements

The navigation devices sold at retail require the radio frequency requirements of a set top box rather than just those of a cable ready TV or VCR. The reason is simple. Both set top boxes and navigation devices sold at retail are connected in front of the TV or VCR. They add another tuner, intermediate frequency amplifier, and remodulator to the chain. If the noise or distortion contribution of the set top box or navigation device sold at retail is to be transparent, it must be much less than that of the TV or VCR itself.

It is a principle of radio physics that the first tuner dominates the noise performance of the system. If subscriber picture quality is to be maintained, then the navigation devices sold at retail must be held to the same standard as the set top box provided by the cable operator.

Arguments can, and will, be made that navigation devices sold at retail are available in the marketplace and marketplace forces should prevail. The marketplace is the most efficient force only when the consumer is well informed. It is difficult – near impossible – to have well-informed consumers on such technical and subtle issues. The opportunity for error is much too great. Since price is such a major factor in consumer purchase decisions, the pressure to reduce costs is

difficult to resist. Inexpensive single conversion TV tuners in plastic boxes with inadequate shielding sold at retail would be a picture quality disaster.

Hazards to Broadcast Reception

The availability of navigation devices sold at retail can create serious hazards to the reception of broadcast signals both on cable and off-air. If the shielding of the tuner is inadequate, direct pick-up of off-the-air broadcast signals will mix with the signals conveyed by cable. Since signals travel through cable at a lower speed than through the air, the over-the-air signal will reach the tuner first. Inadequate shielding will allow this signal to penetrate the tuner and mix with the over-the-air signal arriving later. The result is a degraded signal including ghosts and moving diagonal bands. In some cases the degradation is sufficient to render the picture unwatchable. Broadcast reception on-channel is jeopardized.

A further difficulty arises if the navigation devices sold at retail leaks broadcast signals into the environment. TVs and VCRs in the same residence, not connected to cable may experience interference. Receivers in adjacent apartments may also suffer. If large numbers of inadequately shielded navigation devices sold at retail are installed, even portable TVs may experience problems.

Jeopardizing FCC Cable Technical Rules

The FCC has created strict technical rules for cable system operation. These rules include detailed specifications on set top boxes provided by cable operators. This will all be for naught if set top boxes available at retail are not held to the same specifications.

The chain is only as strong as its weakest link. If the second from the last link -- the subscriber-owned set top box -- is deficient, there is little point in imposing strict technical rules on the rest of the system.

It is reasonable to expect that cable operators will seek to be relieved of strict technical specifications on their set top boxes if subscribers connect lower grade set top boxes obtained at retail. Cable operators incur substantial costs in purchasing well-shielded double conversion tuners with excellent linearity specifications and strict restrictions on the spurious signals back fed into the cable system. All of this is pointless if consumers purchase lower grade set top boxes in significant quantities.

The Decoder Interface Solution

The cable and consumer electronics industries are reaching completion of the Decoder Interface specifications. The Decoder Interface consists of an Intermediate Frequency (IF) link of modulated signals selected by the TV's or VCR's tuner and a twenty six pin connector. The twenty six pin connector can have up to four bi-directional video twisted pairs, four bi-directional audio twisted pairs, a signal reference twisted pair, a control line twisted pair, and three bi-directional twisted pairs satisfying the video specification but reserved for future use. The control line determines the direction of flow of audio and video signal. In its full implementation, the Decoder Interface complies with the specifications for the Audio / Video Bus (AVBus) for interconnection of consumer electronics products. In its abbreviated implementation, the Decoder Interface has just one uni-directional video and audio twisted pair along with the reference and control twisted pairs and the IF connection.

The Decoder Interface and the AVBus connect to a cable which can support up to ten devices and span a distance of thirty feet. Expansion modules allow these numbers to

increase. This system allows the addition of modules which decode subscription signals and provide other features and functions. The signal security modules are intended to be owned and provided by the system operator and the "feature modules" can be either purchased at retail, purchased from the system operator, or leased from the system operator at the consumer's option. Both analog and digital signals are accommodated. This comprehensive system allows for maximum consumer choice and facilitates competition in the provision of in-home equipment. When subscribers wish to try a new service, they plug in the appropriate enabling module. Their investment in equipment is preserved and they are protected against economic loss. Hurdles to trying new services are reduced or eliminated. Duplication of hardware elements is minimized.

THE LAME TELEPHONY ANALOGY

The technically unsophisticated and those who know better but wish to distort the facts to make a point continue to use the telephony analogy. Consumer ownership of telephone Customer Premises Equipment (CPE) has brought significant benefits and only a few problems. In particular, the telco claim that the network will be harmed has not occurred. By simple-minded analogy, the same is argued for cable.

Neglected in this are several significant technical facts. The spectrum used for telephony is just a few thousand Hertz (Hz). If these frequencies leak out into the environment, little harm is caused because these frequencies are not used for other purposes. The same is not true for cable. Cable uses frequencies in its closed environment which are used for many other purposes in the over-the-air situation. Aircraft navigation and communication and emergency services are just a few of the critical applications which must be protected from interference. If unregulated "Navigation Devices" are allowed to be connected to cable, their leakage of signals into the environment will be detrimental.

The telephone system involves individual circuit paths to the subscriber. If the subscriber's equipment emits interfering signals back into the telephone line, it will have limited impact on other subscribers. Since the cable network is a shared network, any signals put back into the system will cause signal degradation for other subscribers. This cannot be allowed.

In the case of telephony, the individual circuit path makes the theft of service very difficult. The same is not true of cable. The shared structure means that the same signal enters all homes in the neighborhood. Signal security is much more important in this case.

Allowing the retail sale of set top boxes for cable is a much more demanding situation requiring more care and regulation.

LEASE VS. PURCHASE

There are important reasons to lease or rent equipment rather than own it:

- can't afford it
- have other uses for funds
- aren't sure what they want
- wish to avoid maintenance and up-keep
- need continued support
- want protection from change

While home ownership is part of the American dream, many simply can't afford it. For these individuals, renting is the only alternative to homelessness. Without the rent or lease option, these individuals and families would be in a difficult situation. In many cases, the monthly rent is about the same or even more than a monthly mortgage payment.

However, home ownership requires an up-front down-payment which is beyond the means of many. Similarly, the availability of cable equipment at lease allows access to services, functions, and features which many could not afford to purchase and own. To restrict the lease to only security functions would deprive these consumers of the availability of features and functions they may desire.

Others might be able to afford the purchase of the in-home equipment but only if they gave up some other purchase or use for the funds. The choice should not be denied them. If there is a better use for the funds, that options should be available. Perhaps it is more important to buy a new TV or VCR and lease the set top box until some later time.

Families who are re-located frequently rent a home even though they can afford to purchase one because they are not sure where they want to live. The same principle applies to hardware at lease. By renting for awhile, a more informed purchase decision can be made later.

If a consumer purchases a navigation device sold at retail which has features closely matching the offerings of one service provider, say the cable company, and later decides to change to a service provider who uses another media, say satellite, fiber optics, or twisted pairs, the ownership of the navigation device will impose a cost to the change that would not be present if the consumer had chosen to lease all of the features and function in a set top box available from the service provider.

Some consumers choose to lease a condominium, not because they can't afford a home, but because they wish to avoid the continuing maintenance and up-keep. Either they don't have the aptitude for these tasks, or they have better things to do with their time, or they simply don't want to be bothered. The same choices should apply to the lease of a set top box.

Subscribers who want continued support from their signal provider would choose an equipment lease rather than take on the cost of service calls.

Finally, there are those who will want the latest services and want the protection from a change in hardware requirements needed to keep up with new services.

There is a growing trend in the lease of automobiles by consumers for much the same reasons. Automobile leases are not restricted to the basic models. All varieties of features and functions are available in this leased equipment.

THE DIGITAL ENVIRONMENT

There is a simple minded assumption that when digital television arrives, security will be high enough to allow subscriber ownership. This is a naïve proposition. There is no reason to believe that digital security will be any better in the long run than analog security.

Signal security is a running battle between the engineers creating the system and those who wish to defeat it. This is not an even match. The designers have a limited budget, a restricted staff, a short time to design the product, and the mature technology of the day to utilize for implementation. Those who would attack the signal security system have unlimited time, arbitrarily large numbers of participants, and an evolving technology. The power of personal computers continues to grow at a phenomenal rate. Both speed and processing power are accelerating. The ability to network these computers together also grows. As we look forward to cable modems with megabit per second speeds linking multiple Pentium Pro processors, truly

massive computing power will be available to "hackers" at very affordable prices. Hundreds of millions of transistors interconnected at high speed will be available to attack the security systems devised at an earlier time under the constraint of being offered at affordable prices. It is ironic that cable's offering of these high speed connections to "the information supperhighway" will facilitate attacks on digital video security.

The vulnerability of a software security solution far exceeds that of a digital hardware solution. With software, the bank of interconnected Pentium computers is especially powerful. No circuit modification is required.

The only test for the conviction of some one who wishes to sell security systems to consumers is an escrow account covering the full cost of recovery from a breach. Anything short of that puts the consumer in danger of having his investment destroyed. Someone needs to be fully responsible for the replacement of the security elements when the security system is breached. If the cable system operator is to be replaced in this role, the retailer or manufacture must take on this serious responsibility.

CONSUMER PROTECTION

The consumer must not be forgotten in the rush to create sales opportunities for retailers. There are significant and legitimate consumer needs which must be protected.

Most importantly, the consumer must not be put in the position of having to abandon an investment in hardware because someone else has breached the signal security system.

Service and replacement parts must be available for the subscriber who wishes to own set top boxes. He must not be subject to "orphaned" hardware. Assistance in installation and operation is important too. If that task falls to the cable operator, the cable operator will have no choice but to charge for the assistance.

The consumer must not be hampered in his choice of services by a previous hardware purchase. It must be emphasized that the hardware is the means to the end. The consumer's principal need and desire is for the services which come through the hardware. The hardware is a facilitator; it must not be allowed to become a barrier.

The consumer who sees value in leasing equipment should not be precluded from doing so by the provincial desires of an industry which wishes to sell hardware.

Of course, the subscriber who continues to lease set top boxes should not have his service degraded by interference from deficient hardware purchased and installed by his neighbor.

These issues are extremely complex, difficult to understand, and change with time. The consumer must be provided with enough information to make an informed choice. There must be remedies to errors and situations where the wrong equipment was purchased.

UNANSWERED ISSUES

There are a number of unanswered issues. Just a few of them are considered here. The first issue concerns the rights of the cable equipment manufacturers. They seem to have been left out in the cold on this. The law applies to cable operators, not equipment manufacturers. But the business of the equipment manufacturer may be potentially impacted in a negative way. The design of set top boxes involves patents and intellectual property. It is not clear what happens when some of that intellectual property is involved. There is no legal requirement for the cable equipment manufacturers to license

intellectual property. This may inhibit a cable operator's ability to comply with what ever rules are created.

Another issue involves equipment which is no longer manufactured or whose manufacturer is no longer in the cable supply business or any other business. What are the cable operator's burdens in these cases. For example, the Cube system or the Oak scrambling systems haven't been manufactured for many years but are still in use.

It is important to recognize that the "look and feel" of a service is an important part of its make up. The on-screen look and the methods of interaction with the remote control are an integral part of the service influencing its attractiveness and ease of use. This necessarily has implications on how the in-home equipment is packaged and offered. It is naïve to think that just a security module is all that is required.

The rights of artists, creative contributors, and holders of copyrights must be protected. If theft of service on a large scale becomes possible, programming will be withheld from this medium. The creators of this programming have no choice but to protect themselves. Without the ability to be fairly compensated for their work, they will not be able to continue. Consumers will end up being the ultimate losers with a loss of access and convenience.

CONCLUSION

The law of the land requires the FCC to create rules to assure the availability of set top boxes – "Navigation Devices" – at retail. There are important protections in that law for

- assuring industry standard-setting body participation
- assuring signal security
- waivers for developmental technology

There are many hazards in this law for consumers and for service providers. Care must be taken to minimize the difficulties.

It is critical that the FCC's technical definition of cable-ready apply to set top boxes sold at retail. If this is not the case, all of the careful work done after the 1992 Cable Act will be undone. In addition, the technical integrity of cable systems will be impaired, consumer signal quality will suffer, other subscribers' services will be degraded, and interference will be caused to other users of the spectrum including aircraft communications and navigation and emergency service communication.

The Decoder Interface can be a powerful tool in meeting the needs of this law.

Clearly managing subscriber expectations is critical to informed consumer choice and to minimizing and properly directing subscriber frustration and anger to its appropriate source.

THE AUTHOR

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Most recently he was Vice President of Technology at Time Warner Cable. Walt joined American Television and Communications, the predecessor to Time Warner Cable, in December of 1982 as Vice President of Research and Development. Prior to that he was with Zenith Electronics Corporation, starting in 1965. He was Director of Sales and Marketing, Cable Products, from 1981 to 1982. Earlier at Zenith he was Manager, Electronic System Research and Development specializing in Teletext, Videotext and Video Signal Processing with

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He has nine patents issued and several more pending. He has presented over one hundred papers and published about fifty, two of which have received awards from the Institute of Electrical and Electronic Engineers (IEEE). His papers have been translated into Japanese, Chinese, German and Spanish. Walt wrote a monthly columns for Communications Engineering and Design (CED) magazine and for Communications Technology (CT) magazine for three years each.

He currently serves on the Executive Committee of the Montreux Television Symposium. He was a member of the board of directors of the Society of Cable Television Engineers (SCTE) for six years. He was Chairman of the Technical Advisory Committee of CableLabs for four years and Chairman of the National Cable Television Association (NCTA) Engineering Committee also for four years. He was president of the IEEE Consumer Electronics Society for two years and is a past chairman of the IEEE International Conference on Consumer Electronics. He chaired the Joint Engineering Committee of the NCTA and the Electronic Industry Association (EIA) for eight years. He has served on several industry standard-setting committees. He currently co-chairs the Cable Consumer electronics Compatibility Advisory Group and its Decoder Interface subcommittee.

Walt is a Fellow of the IEEE, a Fellow of the Society of Motion Picture and Television Engineers (SMPTE), and a Senior Member of the SCTE. Other memberships include Tau Beta Pi, Etta Kappa Nu, and Beta Gamma Sigma.

Current interests center on competitive technology, the consumer electronics interface with cable, Digital Video Compression, Interactive Television, Multimedia, and High Definition Television.

Walt received the 1987 NCTA Vanguard Award for Science and Technology and was named "1990 Man of the Year" by CED magazine. CED also named him "1993 Man of the Year". He was the Fall 1994 Levenson Memorial Lecturer at the National Cable Television Center at Penn State.

Walt has a Ph.D. in Electrical Engineering from Illinois Institute of Technology (IIT) dated 1969. The BSEE and MSEE are also from IIT. He received an MBA from the University of Chicago in 1979. He has taught Electrical Engineering in the evening division of IIT for seven years.

Hobbies include helping his wife with her horses, reading, wood working, photography, skiing, and a hope to someday become more active in amateur radio (WB9FPW).