

ORIGINAL FILE RECEIVED

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

DEC 23 1992

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of)
)
Inquiry into Encryption Technology)
for Satellite Cable Programming)

PP Docket No. 92-234

**COMMENTS OF HOME BOX OFFICE, A DIVISION OF
TIME WARNER ENTERTAINMENT COMPANY, L.P.**

Benjamin J. Griffin
Kathleen A. Kirby
REED SMITH SHAW & McCLAY
1200 18th Street, N.W.
Washington, D.C. 20036

(202) 457-6100

Its Attorneys

Dated: December 23, 1992

No. of Copies rec'd 044
List A B C D E

SUMMARY

The home satellite dish ("HSD") industry is providing and will continue to provide consumers with an increasing range of choices in terms of both reasonably priced programming and reception equipment. The evolution of the industry is progressing rapidly and smoothly, without the need for regulatory management.

Although periodic examinations of C-Band analog equipment competition are healthy, of much more significance, in HBO's view, is the inter-system competition which will soon become a reality in the United States. Alternative technologies and delivery systems, such as high-power DBS, which will offer similar programming but different features and lower priced reception equipment, will have a substantial competitive impact on the C-Band equipment universe.

In assessing the desirability of an alternative C-Band analog encryption system, the Commission must be sensitive to the security risks posed by the technology involved. Piracy has long plagued the HSD industry, and only now, because of the deployment of a secure and renewable encryption technology called VCERS, are the prospects bright for the significant curtailment of piracy.

Any benefits that the introduction of an alternative analog encryption system would have on the C-Band equipment environment must be weighed against the security risks posed by any encryption system which relies on compromised VC II or

a VC II-based technology. In addition, the use of transmission capacity for alternative data streams will preclude the use of such capacity for other important purposes, such as foreign language audio and ancillary information services. Given these potential consequences of competitive analog systems, and potential consumer confusion, the evaluation of alternative technologies should be undertaken not by the government, but by those entities, particularly programmers, who would benefit from increased equipment competition but who would be severely harmed if rampant privacy recurs, if usable transmission capacity is sacrificed, or if consumers are dissatisfied with different capabilities presented by alternative systems.

Finally, the United States television distribution system is beginning to move toward digital technology. The change will create new consumer satellite equipment supply opportunities and will revolutionize the range of video equipment and services available to HSD users. Therefore, an alternative analog C-Band scrambling system may not be the major factor that will influence lower consumer prices and choice.

TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION.....	1
II. BACKGROUND.....	5
A. Development of VideoCipher.....	5
B. Breach of VideoCipher Security.....	6
C. Resecuring of VideoCipher.....	7
D. Continued Piracy.....	9
III. COMPETITION IN THE PROVISION OF VC II DECODERS...	10
A. Security of Competitive Systems.....	13
B. Bandwidth Utilization of Competitive Systems.....	14
C. Compatibility of Competitive Systems.....	16
IV. ACCESS TO THE DBS AUTHORIZATION CENTER.....	17
A. Existing DBS Center Arrangements.....	18
B. Implications of Alternative Access.....	19
V. OTHER TECHNOLOGICAL ISSUES.....	20
CONCLUSION.....	25

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

RECEIVED

DEC 23 1992

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of)
) PP Docket No. 92-234
Inquiry into Encryption Technology)
for Satellite Cable Programming)

To: The Commission

**COMMENTS OF HOME BOX OFFICE, A DIVISION OF
TIME WARNER ENTERTAINMENT COMPANY, L.P.**

Home Box Office ("HBO"), a Division of Time Warner Entertainment Company, L.P., by its attorneys and pursuant to Sections 1.415 and 1.419 of the Commission's Rules, 47 C.F.R. §§ 1.415, 1.419, hereby submits its Comments in response to the Notice of Inquiry ("NOI") released in the above-captioned proceeding on November 4, 1992.¹

I. INTRODUCTION

In its two previous examinations of encryption technology for satellite cable programming,² the Commission recognized that the home satellite dish ("HSD") industry was developing successfully, and it concluded that there was "no

¹ Inquiry into Encryption Technology for Satellite Cable Programming, FCC 92-468 (November 4, 1992) ("NOI").

² See Report in General Docket No. 86-336 ("Scrambling Report"), 2 FCC Rcd 1669 (1987); Second Report in General Docket No. 86-336 ("Second Scrambling Report"), 3 FCC Rcd 1202 (1988); Report in General Docket No. 89-78 ("Encryption Standards Report") 5 FCC Rcd 2710 (1990).

avenue by which additional government regulation could improve the situation."³ The Commission's faith in the ability of private enterprise and competitive forces to shape the industry has been justified. Competition in the HSD equipment and program distribution chains is flourishing, not diminishing, and new, consumer-friendly products and services are being introduced constantly.

The Commission "remain[s] optimistic that the increasingly competitive private sector can navigate this transition"⁴ to new technologies. Nevertheless, at the request of certain Members of Congress, the Commission has opened this current inquiry to "review efforts to develop at least one additional source of video descrambling modules compatible with de facto industry standards" and to "review the feasibility of ensuring that all legal and compatible descrambling modules be eligible for authorization through the Direct Broadcast Satellite (DBS) Authorization Center."⁵

Specifically, the Commission is seeking information regarding: (1) the historical development of scrambling of satellite cable programming services; (2) the potential for competition in the supply of decoder modules for the de facto industry standard C-Band encryption system, particularly modules being promoted by Titan Satellite Systems Corp. ("Titan"); (3) the feasibility of using General Instrument

³ See, e.g., 3 FCC Rcd at 1202.

⁴ NOI at ¶ 2.

⁵ Id. at ¶ 1.

Corporation's ("GIC") DBS Authorization Center to authorize non-GIC decoders; and (4) other relevant technology issues, particularly digital video transmission and a standard decoder interface to accommodate multiple encryption technologies.

HBO remains convinced that the marketplace has worked and will continue to work to create an environment where programming services and the satellite reception equipment necessary to receive them are widely available at reasonable prices. Rather than focus on competition within the C-Band analog system, the Commission, in HBO' view, should recognize the more significant inter-system competition that will soon become a reality in the United States. Moreover, because of the transition to digital video technology that is currently beginning, it is more critical than ever that the government refrain from bureaucratic management and allow the HSD industry to continue to develop in an open marketplace, unencumbered by burdensome and inflexible regulation.

In analyzing and reacting to the information received in response to the NOI, the Commission should be guided by three fundamental principles. First, the HSD equipment environment is of critical importance in the strategic plans of programmers to maximize sales of their services. The competitive forces that will shape this environment, however, will not come from the C-Band analog equipment universe alone. By 1994, satellite programming services and the hardware necessary to receive them will be available from

more sources than ever before. C-Band HSD programming services will face competition from different delivery systems, such as mid-power and high-power DBS. The programming offered by these competing systems in all likelihood will be similar; the distinguishing factor will be the features and the cost of the hardware and programming available from each source. If the C-Band HSD industry is to meet the competition, HBO believes that there will be a dramatic decrease in C-Band equipment prices driven naturally by increased competitive pressures.⁶

Second, the biggest threat to the robust development of the HSD industry is piracy. The industry has migrated through a costly and difficult period of rampant piracy and, after years of effort and millions of dollars of expense, is in the process of resecuring the VideoCipher encryption system. It is imperative for the HSD industry to maintain that security and to eliminate as quickly as possible any security-compromising tools that may still be available to pirates.

Finally, the United States' television distribution system is beginning to move toward digital technology. Although it is important to encourage competition in the supply of analog C-Band decryption equipment, the transition

⁶ Hughes Communications Galaxy, Inc. ("Hughes") and United States Satellite Broadcasting Company, Inc. ("USSB") have already announced plans to offer DBS reception equipment for less than \$700. Current C-Band systems average approximately \$2500. See Comments of the Satellite Broadcasting and Communications Association in ET Docket No. 92-9, filed December 11, 1992 at 5.

to digital will create new opportunities for competitive consumer satellite equipment supply and will revolutionize the range of video equipment and services available to HSD owners.

The migration to digital will require a transition period to assure that existing analog users continue to receive the services they currently enjoy. The length and nature of the transition will depend in large measure on the security of the analog system and equipment prices. If security is maintained and C-Band equipment prices fall, the transition is likely to be extended. If, on the other hand, C-Band security is compromised again, or if C-Band analog equipment prices remain sufficiently higher than digital equipment prices, there will be business incentives to complete the transition to more secure and less expensive digital hardware expeditiously. In any event, equipment suppliers and programmers are well aware of the need for a workable transition and will ensure that it occurs without the need for government intervention.

II. BACKGROUND

A. Development of VideoCipher

The Commission's description of the historical development of the scrambling of satellite cable programming services is generally accurate.⁷ As the Commission states, HBO was the first video network to use satellite

⁷ See NOI at ¶¶ 4-11.

distribution. In 1986, HBO began full-time scrambling of its satellite feeds. Since that time, virtually all of the major domestic satellite cable programmers have instituted signal scrambling, and GIC's VideoCipher technology has emerged as the de facto scrambling standard for domestic C-Band satellite transmissions.

B. Breach of VideoCipher Security

Not long after the VideoCipher II ("VC II") encryption system was deployed, reports began to surface that the system's security had been compromised. Once the security was broken, a substantial black market in illegally altered consumer descramblers rapidly developed. By the end of 1991, approximately 2.7 million VC II decoders had been sold to consumers. Almost half of them had been modified and were being used in the United States to steal programming.⁸ More than 500,000 others were modified and sold to consumers in Canada, Mexico, and elsewhere for the purpose of receiving program services without authorization.⁹ According to industry estimates, of approximately 2.7 million VC II decoder owners at year end 1991, only 780,000 paid for at least one program service.¹⁰

⁸ "Another Look at GI and the VideoCipher," Satellite Business News, May 6, 1992 at 5.

⁹ Id.

¹⁰ Id.

C. Resecuring of VideoCipher

After numerous attempts to restore security by electronic counter-measures and legal actions against pirates, it became evident that a change of the security system technology would be required. By April 1990, HBO had begun using a more secure version of VC II, called VC II Plus. The VC II Plus technology required the transmission of a second authorization data stream which was carried in the vertical blanking interval ("VBI"). Because there were still many thousands of legitimate VC II decoders being used by consumers, it was also necessary for programmers to continue to transmit the VC II data stream, which was carried in the horizontal blanking interval ("HBI").¹¹

After several months passed and the VC II Plus encryption system remained secure, the next logical step toward completely resecuring the system was to eliminate the VC II data stream which formed the basis for the pirates' attacks. Accordingly, HBO and several other major programmers contracted with GIC in late 1991 and early 1992 to upgrade legitimate VC II decoder users to a renewable version of VC II Plus, again with the authorization data stream transmitted in the VBI. This "renewable security" encryption system, termed VideoCipher-RS ("VCRS"), is a

¹¹ The Commission's NOI implies that the VC II algorithm has not been broken. See NOI at ¶ 13. However, the VC II signal has been transmitted in HBI and all pirates decode VC II HBI signals. In order to deprive pirates of this aid, it is essential to eliminate all signals that are based upon VC II, particularly those in HBI.

version of VC II Plus which more easily permits the system to be resecured if compromised in the future. If a future compromise were to occur, VCRS consumers would receive a TvPass security card, bearing security information, for insertion into their VCRS units. According to industry reports,¹² GIC invested approximately \$50 million to supply legal VC II owners with free VCRS modules.

Once all of the VC II modules had been replaced by VCRS modules in the decoders of legitimate customers, programmers were able to shut off the VC II data stream which had been compromised by the pirates. On October 19, 1992, HBO shut down its VC II consumer data stream and switched entirely to VC II Plus scrambling for HSD consumers. Other programmers quickly followed. As explained below, HBO currently is still using a VC II data stream to authorize its commercial decoders.

HBO and other programmers have experienced rapid growth in HSD subscriptions in the last few months, presumably as pirates anticipated and reacted to the fact that their free programming would cease with the shutdown of the VC II consumer data stream. In a single year (1992), HBO will have obtained a number of HSD subscriptions equal to the number it signed in the six years since it began marketing programming services to HSD consumers.

¹² See "Countdown to Renewable Security," Broadcasting, July 27, 1992 at 56.

D. Continued Piracy

Although HBO has extinguished its VC II consumer data stream, it continues to use the VC II commercial data stream to authorize its cable television and other commercial customers.¹³ Now that programmers have discontinued the VC II consumer data stream and the VC II consumer units have been replaced, there is growing evidence that pirates are turning their efforts to the VC II commercial units and the commercial data stream to continue the theft of cable program services.

GIC recently conducted a test by transmitting false consumer keys over the VC II data stream designed to deauthorize pirated consumer decoders.¹⁴ Simultaneous with this test, HBO experienced a significant increase in calls from HSD consumers seeking to become HBO customers. Moreover, HBO is aware of widely advertised 900 numbers that consumer users may call to receive pirated keys obtained from

¹³ There are two distinct types of VideoCipher decoders, a consumer decoder used for reception by HSD consumers and a commercial decoder used by cable television and other commercial program affiliates that retransmit program services to their own subscribers.

¹⁴ Each month, through its authorization center, GIC sends out an electronic authorization key for the current month along with a key for the following month. VC II pirates use that number to calculate the code that is entered into decoders to activate "wizard" chips to steal programming. On November 1, 1992, GIC's DBS Center sent out a false authorization key for November. Since VC II pirates had calculated their "wizard codes" using the false authorization message, thousands of tampered VC II decoders lost service. See "ECM Sets Module, Software Sales Flurry," Satellite Business News, November 18, 1992 at 1.

commercial decoders. There have also been indications that piracy problems may arise with commercial program distributors.¹⁵

Based on the information described above, it appears likely that piracy of the VideoCipher system will continue as long as VC II commercial decoders are in operation and the VC II data stream is available. HBO believes that only when all VC II data streams are eliminated from the HBI, and only VCRS authorization signals are transmitted in the VBI, will the VideoCipher security problem be resolved. Accordingly, HBO has instituted a program to upgrade its commercial distribution system to VCRS technology, and HBO intends to cease transmitting its VC II commercial data stream in 1993.

III. COMPETITION IN THE PROVISION OF VC II DECODERS

Fundamentally, HBO favors robust competition in the supply of consumer satellite equipment. Competition is in the best interest of both consumers and programmers because it encourages lower equipment prices and thereby lowers the economic threshold for consumers to become direct-to-home ("DTH") subscribers to HBO's and other programmers' services. Currently, there is widespread competition in most aspects of

¹⁵ A recent industry report described how commercial program distributors, both large and small, could take full advantage of the fact that GIC upgraded consumer but not commercial equipment to VCRS. "Cable CO's Using Cloned Decoders," Satellite Watch News, November 1992 at 8. The report stated that there is evidence that some commercial program distributors are extracting keys from commercial decoders and cloning them for use in their commercial establishments. Id.

the DTH business. For example, consumers may purchase HBO program services directly from HBO and from as many as eighteen (18) competitive distributors that have national rights to sell HBO's services to DTH subscribers, at retail prices established by those distributors. In addition, a myriad of cable operators price and sell HBO program services to HSD subscribers locally within their franchise areas. DTH consumers also may purchase HBO's services from approximately 4,000 satellite equipment dealers. There are two manufacturers of VCRS modules (GIC and Channel Master), and more than a dozen manufacturers of consumer satellite integrated receiver/decoders ("IRDs") containing VCRS modules. In addition, there are approximately 6,000 retailers of HSD equipment. Despite this competition, in HBO's view, the price of modules and IRDs has not reached a minimum level. Increased competition should further reduce the cost of this equipment.¹⁶

Although HBO supports increased competition among equipment suppliers, competing technologies should be driven by customer demand in the marketplace rather than mandated by the government. HBO believes that competitive forces within the market will work to the advantage of consumers without the need for government intervention. Specifically,

¹⁶ If more competition in equipment supply develops, HBO does not believe that lower prices will become prevalent immediately. New start-up manufacturers will need to amortize fixed costs. Moreover, decoder manufacturers cannot control the markups charged by receiver manufacturers, distributors and dealers.

competition within the HSD equipment market will come about in two ways. First, competition will come from within a particular system where competitive hardware technology is widely licensed. Second, as mentioned above, alternative delivery systems, such as high-power or mid-power Ku-Band DBS, will provide competitive technology for C-Band hardware through the use of diverse encryption systems.¹⁷ Thus marketplace forces will ensure that both programming services and reception equipment are widely available at reasonable prices.

From HBO's perspective, there are three critical business factors that must be evaluated in assessing encryption equipment technology: (1) whether competitive decoders to be marketed by that manufacturer create security risks; (2) whether the competitive manufacturer's technology will require additional authorization data streams and what portion of a programmer's satellite capacity, if available, is necessary to carry multiple data streams; and (3) whether the competitive technology is fully and totally compatible with full functionality so as not to cause consumer confusion.

¹⁷ PRIMESTAR Partners, L.P. ("PRIMESTAR"), a mid-power Ku-Band DTH operator, currently uses an encryption system developed by Scientific-Atlanta, Inc., and the high power DBS system to be launched by Hughes will use an encryption system developed by Thomson Consumer Electronics Inc. ("Thomson").

A. Security of Competitive Systems

The Commission's NOI focuses specifically on Titan, which has acquired the rights to VC II HBI technology and has stated its desire to market a decoder module to compete with existing units. If any VC II or VC II-type technology using the HBI were secure, its deployment might have a positive competitive effect. However, as explained above, VC II has been hopelessly compromised, HBO has discontinued the use of the VC II consumer data stream, and it will discontinue the use of the VC II commercial decoders and data stream in 1993. Pirates have accumulated a vast body of knowledge as a result of their efforts to break VC II encryption; given this body of knowledge, it is only a matter of time before pirates will compromise any system that relies on the same or similar technology. From HBO's perspective, it is inconceivable that a programmer who has lost millions of dollars in revenue from pirated VC II equipment would utilize a product that incorporates HBI transmission of a technology based upon VC II. Therefore, HBO would only consider an alternative encryption technology without any links to, and which does not use, the compromised VC II or VC II-like technology transmitted in the HBI.

The Commission has long recognized that the theft of satellite services is the single biggest problem facing the HSD industry, and that failure to bring it under control

could threaten the future of DTH transmissions.¹⁸ The Commission also has acknowledged that the high stakes involved provide substantial incentives to industry participants, manufacturers, programmers, dealers, and others to combat piracy.

Piracy has created monumental problems for the HSD industry. Since the industry's inception, HSD players have expended significant resources in anti-piracy efforts. It is the programmers who have suffered most acutely.

With the advent of VCRS, the prospects are bright that home satellite signal piracy can be significantly curtailed. If competitive systems are proposed, programmers will measure the potential benefits to be gained from lower equipment prices derived from equipment competition against the potential losses that would be sustained if the competitive equipment is compromised. For the Commission to attempt to make this judgment and require the marketplace to utilize a VC II-like or any other technology that threatens to renew piracy and jeopardize the future of HSD would be in direct contravention of the Commission's policies, which have sought to encourage the development of HSD services.

B. Bandwidth Utilization of Competitive Systems

If a secure competitive descrambler is developed, from a programmer's perspective, the benefits of increased equipment

¹⁸ See, e.g., Encryption Standards Report, 5 FCC Rcd at 2718.

competition must be balanced against the satellite transmission capacity required for the alternative data streams necessary to support the competitive technologies. Programmers must assess their overall business needs when considering the use of transmission capacity for any purpose. For example, HBO currently uses subcarriers in its satellite transponders for Spanish language versions of its programming. In addition to using the VBI for the VCRS data stream, HBO uses the VBI to provide closed-captioning for the hearing impaired and to test signal quality. HBO has plans to use the VBI to provide interactive television services and electronic program guide information.

Providing duplicative data pipelines for use by competing analog scrambling systems may present a capacity problem. Like HBO, many programming services utilize transponder capacity for a multiplicity of important VBI and subcarrier services which may be displaced by the need for capacity for competitive data streams.¹⁹ Thus, in terms of bandwidth efficiency, it is preferable to have one as opposed to multiple data streams for decoder control.

Moreover, in the not too distant future, digital transmission will be the rule rather than the exception. HBO

¹⁹ This situation is analogous to that addressed by the Commission in its First Report and Order in Gen. Docket No. 86-337 (released May 17, 1990) (Automatic Transmitter Identification System). There, the Commission recognized that use of the vertical blanking interval for ATIS would result in a loss of the vertical blanking interval for other potential uses, such as the distribution of teletext information.

will begin digital transmission in 1993 and will continue its analog services for as long as the marketplace so requires. In a digital environment, the authorization data stream will be part of the digital video signal. The use of digital capacity for multiple authorization data streams is possible, however it will diminish the amount of information making up the video and audio signals, and related services, that can be transmitted. To the extent digital bits are devoted to authorization data, fewer bits are available to transmit video and audio information, and at some point, the alternative data streams may result in a reduction in the quality of the program transmission or require the elimination of ancillary information services.

C. Compatibility of Competitive Systems

A third factor that users of encryption systems will evaluate in connection with alternative technologies is the compatibility between the new and the existing systems. Even though new alternative systems may be transparent to existing HSD customers, it is important that all technologies within a system (such as C-Band analog) share certain core features and capabilities. Otherwise, HSD consumers may become confused and frustrated if the enjoyment of certain features, capabilities, or enhancements to various program services (such as on-screen program information or parental control features) depends on the scrambling system technology they have chosen.

IV. ACCESS TO THE DBS AUTHORIZATION CENTER

In its NOI, the Commission requests information regarding the operation of the GIC DBS Authorization Center in San Diego.²⁰ The Commission has also requested information on whether a competitive provider should be guaranteed access to GIC's DBS Authorization Center.²¹ GIC's DBS Center is used by all of the domestic satellite cable programmers that use the VideoCipher System to authorize their C-Band HSD subscribers.²² Programmers and/or their sales agents transmit information to the DBS Center regarding subscribers to each service. The Center serves to combine the information into an authorization data stream, which it then sends back to the VideoCipher scramblers at the uplinks of all participating programmers' satellite feeds. Thus, each satellite signal has embedded in it the authorization information for all subscribers and all participating channels. An individual HSD system needs to receive its authorization message on only one channel in order to be authorized for all the channels to which the customer has subscribed. This "universal" ability to change (and view) scrambled channels is a key HSD feature and one which must be maintained.

²⁰ NOI at ¶ 18.

²¹ NOI at ¶ 19.

²² NOI at ¶ 16.

A. Existing DBS Center Arrangements

The programmers that use the DBS Center do so pursuant to agreements with GIC. Basically, these agreements allow distributors of programming services to operate subscription satellite television services using GIC's scrambling and descrambling technology. Under the agreements, the cost of operating the Center is essentially allocated among its users, which include programmers and program distributors authorized by one or more programmers to sell subscription programming services to HSD owners. The Center, in turn, is responsible for operating all computers, software and peripheral equipment to provide a descrambler database and a data channel which contains descrambler authorization data. Programmers, at their cost and expense, acquire and install the equipment necessary for receiving, demodulating, decoding and interfacing the data channel to the programmer's scrambling system at its uplink facility.

The data channel provided by the DBS Center contains many thousands of unique authorization words representing each descrambler being addressed as well as tier-bits which are assigned to a programming service or group of services. Under the agreements, programmers have the right to have assigned for their exclusive use one of the available tier-bits for each of that programmer's separate scrambled uplink channels using separate transponders and providing a continuous service on a full-time basis. These tier-bits

indicate to a particular VideoCipher descrambler which programming service(s) it is authorized to receive.

B. Implications of Alternative Access

GIC is in a better position than HBO to comment on the technical feasibility as well as costs, security and other implications that would arise if competing scrambling systems share the DBS Center. All things being equal, if there are to be multiple competing scrambling systems, HBO would prefer that they all share a single DBS Authorization Center. Clearly, there are economies of scale to be achieved from such an arrangement. Centralizing the decoder authorization function may be more cost effective as well as operationally efficient. Given one DBS Center, a programmer need only interface with, and receive a data stream from, a single point.

Although a single DBS center may foster certain efficiencies, establishing separate centers for separate DBS technologies does not appear to be a barrier to entry for competing encryption systems. In the United States, there currently is one additional authorization center in operation by PRIMESTAR for use with its Ku-band DTH service. Hughes also will establish an authorization center for its DirectTV high-powered DBS service which is scheduled to commence in 1994. Additionally, in early December, Tele-Communications, Inc. ("TCI") announced plans to construct an authorization center to be used for its cable television and DTH

subscribers that will use digital compression and conditional access technology to be supplied by GIC and American Telephone and Telegraph Company ("AT&T").²³ In Europe, various DBS authorization centers are used for DBS businesses using differing satellite encryption systems.

If multiple technology access to the DBS Center is technically feasible and does not impair security or raise the costs for existing users, HBO would support such multiple access. In HBO's view, other programmers would have similar incentives; therefore, it is likely that if a secure, competitive analog scrambling technology becomes available, the operation of the marketplace will resolve any issues regarding access to the DBS Center. Based on the number of authorization centers that have been or will be established, however, it does not appear that GIC's Center constitutes a bottleneck so as to warrant the government mandating access for alternate scrambling technologies.

V. OTHER TECHNOLOGICAL ISSUES

The Commission correctly acknowledges that the VideoCipher system is not the only encryption technology available today and seeks comment on the availability of other scrambling technologies.²⁴ HBO currently is using the B-MAC system of Scientific-Atlanta, Inc. for its programming

²³ "TCI Orders General Instrument Compression, Leaves Door Open for Competitors," Communications Daily, December 3, 1992 at 1.

²⁴ NOI at ¶ 21.

services in South America and Southeast Asia. The B-MAC system and the other systems mentioned in the NOI²⁵ are analog systems. Although it is important to ensure competition in the supply of analog HSD decoders, HBO believes that the most significant development in the next few years will be in digital technology and that, over time and in large measure, digital will supplant analog.

The Commission is correct in its assertion that the trend in television transmission is to digital and that the pace toward this transition is accelerating.²⁶ Digital video compression is a new technology guaranteed to enhance greatly the efficiency of all television transmission systems, including satellite and microwave, coaxial cable and fiber optic. Digital compression will facilitate the growth of program services by: (1) using less bandwidth per service and effectively creating more transmission capacity; (2) improving the quality of television signals, given minimal generational loss in the digital realm; and (3) reducing satellite and other transmission costs for start-up services.

In the United States, many program networks will begin digital transmissions in 1993. Already, HBO, TCI, the Public Broadcasting System and Viacom International Inc. have announced plans to use digital compression for their program transmissions. By 1995, digital will be well on its way from the exception to the rule. The growth of new video and

²⁵ NOI at n.25.

²⁶ NOI at ¶ 23.