

WOMBLE
CARLYLE
SANDRIDGE
& RICE

A PROFESSIONAL LIMITED
LIABILITY COMPANY



1401 Eye Street, NW
Seventh Floor
Washington, DC 20005

Telephone: (202) 467-6900
Fax: (202) 467-6910
www.wcsr.com

Mark J. Palchick
Direct Dial: (202) 857-4411
Direct Fax: (202) 261-0011
E-mail: MPalchick@wcsr.com

October 30, 2009

VIA ECFS

Marlene Dortch, Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: CS Docket 97-80: Notification of Ex Parte Communications

Dear Ms. Dortch:

I hereby submit this notice of *ex parte* communications by Massillon Cable TV, Inc.

On October 29, 2009 Robert Gessner, President of Massillon Cable TV, Inc., and I had two meetings with FCC staff in order to discuss Massillon's cable television digital transition process and to advise the Commission on two consumer issues that arose during the transition to a full digital system. First, the absence of SimulCrypt technology in Motorola and Cisco headends may be artificially limiting competition for price and features among set top boxes. Second, an obligation to encrypt basic standard definition channels (and thus defeat Clear QAM) may limit consumer choice and could artificially raise the cost of delivering service to consumers by requiring a set top box for standard definition basic service. Massillon suggested that a Notice of Inquiry concerning SimulCrypt and Clear QAM might be appropriate. In addition to the oral presentations, we provided FCC attendees with the attached written materials.

Our first meeting was with Commissioner Mignon Clyburn and Rick Kaplan, Commissioner Clyburn's Acting Legal Advisor, Media and Chief of External Affairs. The second meeting was with William Friedman, Acting Senior Legal Advisor to Commissioner Meredith Attwell Baker. Both meetings were held in the FCC's Washington, DC headquarters building.

Respectfully submitted,

Mark J. Palchick
Counsel to Massillon Cable Communications, Inc.

cc: Hon. Mignon Clyburn (via electronic mail)
Rick Kaplan (via electronic mail)
William Friedman (via electronic mail)



Massillon Cable TV, Inc.

One Connection. A World of Possibilities.

814 Cable Court N.W.

Post Office Box 1000

Massillon, Ohio

44648-1000

August 21, 2009

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, DC 20554

Re: CS Docket No. 97-80 (Commercial Availability of Navigation Devices)

330-833-4134

FAX 330-833-7522

Dear Ms. Dortch:

The following letter outlines two issues that potentially raise costs and reduce choices to consumers for cable television service, limit innovation in the set-top converter market and inhibit the full use of consumer electronics. These two topics are SimulCrypt and Clear QAM signal transmission. I respectfully request that you forward this information to the Commissioners' offices and I further respectfully request meetings with their offices to discuss these issues and the available solutions

EXECUTIVE SUMMARY

Massillon Cable TV, Inc. (Massillon) recently completed a massive spectrum recovery project. This project was made possible by a separable security waiver from the FCC. The recovered spectrum has already been used to launch many High Definition (HD) and Standard Definition (SD) TV services and pave the way for DOCSIS 3.0 data services.

Massillon varied from others who have made the transition to all-digital/no-analog systems by pioneering a new type of set-top converter. Notably, these converters were not manufactured by Motorola or Cisco/Scientific Atlanta.¹ Instead, Massillon forged relationships with new manufacturers and distributors to bring new competition, lower prices and new features to consumers. These relationships went well beyond simply purchasing "dumb" set-top converters. They include access to new conditional access providers and the promise of long-term cost reductions.

¹ Motorola and Cisco/Scientific Atlanta are widely recognized as a US duopoly in the set-top converter market. Their control of the market through proprietary conditional access systems leaves cable operators little choice in terms of set-top converter prices, features or suppliers.



Massillon Cable TV, Inc.

One Connection. A World of Possibilities.

814 Cable Court N.W.

.....
Post Office Box 1000

.....
Massillon, Ohio

.....
44648-1000

.....
330-833-4134

.....
FAX 330-833-7522

Two conclusions came to light during this project.

1. Cable providers need access to (and support for) a system known as SimulCrypt² in order to preserve the benefits of low-cost set-top converters beyond current Digital-To-Analog converters. Otherwise, a competitive market for Digital-To-Digital set-top converters will not develop. Without SimulCrypt, all digital services will eventually require the use of more expensive Digital-To-Digital set-top converters from one of these duopoly providers. Thus, our deployment of low-cost set-top converters will have only a temporary benefit of lower prices for Digital-To-Analog converters which, by design, have only a short lifespan. More importantly, other cable providers will not be able to follow our example and purchase low-cost converters as they move toward their own all-digital futures.
2. An appropriate balance between consumer desires and content protection must be found in terms of signal encryption. Consumers are adopting digital TV sets at a rapid pace in spite of the current economy. It is possible to present them with a wide range of SD and HD programming without the need for a set-top converter. This has obvious appeal to consumers. However, this wide variety of programming is threatened by requirements to encrypt all digital program services. This requirement, if widespread, will strip consumers of the ability to use their digital TV sets fully and force them to install (and pay for) a set-top converter on every TV set instead. Coupled with the current unavailability of SimulCrypt, this encryption will require consumers to use higher-cost set-top converters as well. While easy access to programming is important to consumers, it also is important to recognize the legitimate concerns that content owners have regarding the security of their programs. Standard Definition programming included as part of Basic Cable service currently is largely unencrypted and available to consumers with digital TV sets. It does not provide the same level of quality and clarity as High Definition programming. Therefore, it is less valuable. High Definition programming, on the other hand, is widely acclaimed for its quality and has become a target for content piracy. As a result, virtually all High Definition programming (other than HDTV signals of local broadcast stations) are encrypted. It is our conclusion that this

² SimulCrypt is a system that allows multiple encryption keys to function on the same digital program stream. Motorola and Cisco/Scientific Atlanta have both developed SimulCrypt and include it in their products. However, they will neither provide nor support SimulCrypt in the United States. They do provide SimulCrypt in other parts of the world where they face significant competition for both set-top converter and conditional access system sales.



Massillon Cable TV, Inc.

One Connection. A World of Possibilities.

814 Cable Court N.W.
.....
Post Office Box 1000
.....
Massillon, Ohio
.....
44648-1000
.....

current scenario provides the appropriate balance. Consumers can watch the program networks they have come to expect without a set-top converter in roughly the same quality (Standard Definition). They must, however, install a set-top converter in order to enjoy the higher quality of HD. This also preserves the current protections enjoyed by the program owners.

Therefore we ask the Commission to consider whether it is in the best interest of consumers to:

1. Require manufacturers of conditional access systems (CAS) to include and support SimulCrypt. This would enable MVPDs to make a wider range of options available to consumers, including low-cost, one-way, small-profile set-top (or set-back) converters. This will enable digital TV owners greater flexibility to choose the type of set-top converter that best suits each individual budget and application.
2. Require program networks to allow distribution of unencrypted Standard Definition signals and allow program networks to require distribution of encrypted High Definition signals. This would enable digital TV owners to use their advanced TV sets fully without unreasonably impinging on the rights of program distributors.

330-833-4134
.....
FAX 330-833-7522
.....

SIMULCRYPT
Theory of Operation

SimulCrypt is a system that allows multiple encryption keys to function on the same digital program stream. Digital signals are scrambled (or "encrypted") in the headend with an Encryption Key. The "key" is required to reassemble the digital information into recognizable video and audio elements. The conditional access system creates a signal in the digital stream which carries the key to the converters. The SimulCrypt standard allows multiple CAS vendors to encrypt and carry this key. Set-top converters receive this key as part of the digital signal. Authorized set-tops receive the key and can, therefore, unscramble the encrypted digital signal. Unauthorized set-tops lack the key and cannot.

Different CAS use different encryption algorithms to secure their keys. Therefore, they also have different implementations in the converters. Despite these differences, the standardized method called SimulCrypt allows the same digital video signal to be encrypted once and delivered successfully using multiple CAS encryption algorithms. The multiple keys also can be transmitted in a variety of methods. In this manner, SimulCrypt allows a cable system to install multiple CAS and provide the same services to consumers even when they are equipped with different converters. The



Massillon Cable TV, Inc.

One Connection. A World of Possibilities.

814 Cable Court N.W.
.....

Post Office Box 1000
.....

Massillon, Ohio
.....

44648-1000
.....

330-833-4134
.....

FAX 330-833-7522
.....

great benefit is the ability to use multiple CAS and different set-top converters without having to dedicate additional spectrum.

SimulCrypt Is More Than A Theory.

Motorola and Cisco/Scientific Atlanta (Cisco) incorporate SimulCrypt into their headend products that are widely sold in Europe and other continents. The availability of SimulCrypt in other world markets has led to the development of more than a dozen different CAS and dozens of competing set-top manufacturers. Only the US lacks this open standard and the benefits of competing vendors.

Neither Motorola nor Cisco offer and/or support SimulCrypt in the United States. Refusing to offer or support SimulCrypt allows Motorola and Cisco to maintain their positions as duopoly providers of CAS in the US. Cable operators already have significant investments in Motorola and Cisco proprietary CAS and set-top converters. Activating a competing CAS would require completely abandoning the headend CAS and replacing all set-top converters. This would be expensive, time-consuming and highly intrusive to consumers. The inability of cable operators to install competing CAS keeps prices for set-top converters high and innovations low.

As might be imagined, SimulCrypt is provided and supported in regions where the US duopoly providers have been unable to secure set-top sales due to a large price difference. They are unable to sell high-priced set-top converters, but they still compete for the headend equipment sales. To do this, they must support SimulCrypt. For example, Motorola recently announced a new product; the APEX 1000. The advertising information announcing the European version prominently features the fact that SimulCrypt is available. The exact same product is advertised in the US but all mention of SimulCrypt is eliminated from the advertising material.

Massillon uses Motorola equipment so I am more familiar with it. The Operations Manuals and Application Notes are filled with references to SimulCrypt and yet Motorola refuses to provide or support it. The same equipment we use is offered in Europe and Motorola not only supports SimulCrypt, but they actively promote it. We suspect that the reason Motorola does not provide SimulCrypt in the United States is that they fear it would lead to the introduction of competing conditional access systems and new set-top converter manufacturers and distributors. Plain and simple, Motorola is protecting their US set-top converter market by refusing to support a product they manufacture. Access to SimulCrypt would enable us to provide more customer choice and new, lower-cost options to our



Massillon Cable TV, Inc.

One Connection. A World of Possibilities.

814 Cable Court N.W.

Post Office Box 1000

Massillon, Ohio

44648-1000

330-833-4134

FAX 330-833-7522

customers. The refusal of Motorola and Cisco/Scientific Atlanta to provide and support this existing feature is anti-competitive and anti-consumer.

Multiple Conditional Access Systems Work

Massillon has two CAS: Motorola and Conax. Both of them are integrated into our customer billing system and work properly. We have completed proof-of-concept tests of the Conax system. It provides excellent security for the digital signals and accurate, timely control of set-top converters. However, due to the unavailability of SimulCrypt, we have not implemented it on a wide-scale basis.

In summary, SimulCrypt is vital to a competitive set-top converter market.

- o With SimulCrypt, cable systems have a choice among multiple vendors for both headend processing and set-top converters. They can choose the best CAS based on varying needs and prices. Multiple set-top vendors can, and do, manufacture low-cost, innovative devices where this open standard system is available.
- o Without SimulCrypt, cable systems must install a proprietary CAS and continue to purchase set-top converters from only one provider. This gives the provider no incentive to reduce the cost of the set-top converters or provide low-cost options.

Without SimulCrypt, Capacity Requirements Limit Multiple CAS

It is theoretically possible to operate multiple CAS without SimulCrypt. To do so, a cable system must duplicate a great deal of headend equipment in addition to the second CAS. Without SimulCrypt, the cable operator must also purchase, install and maintain a duplicate set of equipment to transmit all encrypted signals. This is called a simulcast; one set of signals for each CAS. This makes it technically possible, but financially unfeasible. The introduction of broad HD program offerings makes multiple CAS impossible without SimulCrypt due to bandwidth limitations of simulcasting.

If the cable system were to eliminate its analog spectrum and add no additional services, a second CAS is easily accommodated. The cable system would have adequate spectrum to simulcast the encrypted SD and HD signals and control them with a second CAS. It would require about 150MHz of spectrum for this simulcast (the total encrypted spectrum).

Of course, that is not the goal of analog spectrum reclamation. The goal is to launch new HD signals and DOCSIS 3.0 High Speed Data. So, the cable system will launch 50 or more HD signals (requiring up to 150MHz) and bond channels together for DOCSIS 3.0 (requiring another 30MHz).



Massillon Cable TV, Inc.

One Connection. A World of Possibilities.

814 Cable Court N.W.

Post Office Box 1000

Massillon, Ohio

44648-1000

330-833-4134

FAX 330-833-7522

In a traditional cable system (without broad HD services), the majority of spectrum (perhaps 70%) is used for analog signals. Only a limited number of services are encrypted and controlled by the CAS. The amount of spectrum allocated to Standard Definition digital signals is fairly small and most are not encrypted. A cable operator would only need to recover a fairly small amount of analog spectrum in order to simulcast these encrypted SD digital signals using a second CAS. This changes with analog reclamation and the introduction of many HD signals because HD signals require far more spectrum than SD and they are encrypted. An example may be the easiest explanation.

Following is a spectrum allocation for a typical cable system under three scenarios.³ The two digital scenarios assume the cable system is operating multiple CAS.

1. Now (analog/digital operation) – The system includes a large number of analog channels plus typical SD and HD offerings.
2. SimulCrypt – The system has recaptured analog spectrum and has used that spectrum to launch new HD and SD networks and offer DOCSIS 3.0 High Speed Data. The system still has sufficient spectrum to add almost 100 more HD services.
3. No SimulCrypt – The system has recaptured analog spectrum and has used the spectrum to launch new HD and SD networks and offer DOCSIS 3.0 High Speed Data. While increasing HD offerings to some extent, the system is now spectrum locked and cannot add any more services.

As the chart shows, a system with SimulCrypt will be able to easily accommodate many new services. At the same time, SimulCrypt will also easily accommodate equipment from multiple set-top vendors. This creates the potential for vigorous competition among those vendors. Conversely, a system without SimulCrypt will struggle to add new services because all encrypted video signals will require twice the spectrum. The alternative is to continue with only one set-top vendor.

³ Assumptions include: The system eliminates all analog signals. 6MHz of spectrum equals one analog, 12 SD or 2 HD signals. Rounding results in slight differences. Maintaining some level of analog signals and/or changing the compression ratio of SD and HD signals will yield different results, as will the use of other technologies like switched digital video. However, the fact remains that a system using SimulCrypt will always have the capacity for significantly increased service offerings assuming the cable system wishes to deploy multiple CAS.



Massillon Cable TV, Inc.

One Connection. A World of Possibilities.

814 Cable Court N.W.

Post Office Box 1000

Massillon, Ohio

44648-1000

330-833-4134

FAX 330-833-7522

Type of Signal	Type of Security	Before Analog Reclamation		After Reclamation with SimulCrypt		After Reclamation without SimulCrypt	
		Channels	MHz	Channel	MHz	Channels	MHz
Return Path		NA	50	NA	50	NA	50
Analog		80	480	0	0	0	0
SD Digital	Unencrypted	80	40	100	50	100	50
	CAS #1 Encrypted	144	72			144	72
	CAS #2 Encrypted	0	0	144	72	144	72
HD Digital	Unencrypted	5	15	10	30	10	30
	CAS #1 Encrypted	25	75			42	216
	CAS #2 Encrypted	0	0	72	216	72	216
Non-Video		NA	18	NA	48	NA	48
		254	750	329	466	304	754
		Spectrum locked		284 MHz Available		Spectrum Locked	

Small System Considerations

The US cable TV industry has operated within a duopoly market for addressable set-top converters almost since these devices first became available 30 years ago. Both of these suppliers offer only proprietary systems so there is virtually no competition between them after the initial decision is made to deploy a converter system. Thus, the market power exerted by the two major suppliers has been especially difficult for small- and medium-sized cable companies because we lack sufficient size to negotiate lower prices through bulk purchasing. Despite the ever-growing volume of the set-top converter market and the ever-shrinking costs of other consumer electronic devices, the capital cost for set-top boxes continues to climb. Historically, we have had little choice but to pay whatever price is set because, without the equipment, we will not be competitive. We are on the horns of a dilemma. We must purchase and deploy addressable set-top converters demanded by consumers, but each purchase puts us more tightly in the grasp of a sole supplier. SimulCrypt, with its ability to allow the introduction of new set-top converters without sacrificing the embedded base, offers an opportunity for vendor competition and consumer choice.

Therefore we ask the Commission to consider whether it is in the best interest of consumers to require manufacturers of conditional access systems to include and support SimulCrypt. This would enable MVPDs to make a wider range of options available to consumers, including



Massillon Cable TV, Inc.

One Connection. A World of Possibilities.

814 Cable Court N.W.
.....
Post Office Box 1000
.....
Massillon, Ohio
.....
44648-1000
.....

330-833-4134
.....
FAX 330-833-7522
.....

low-cost, one-way, small-profile set-top (or set-back) converters. This will enable digital TV owners greater flexibility to choose the type of set-top converter that best suits each individual budget and application.

DIGITAL SIGNAL ENCRYPTION

Consumer Expectations

One of the observations from Massillon's recently-completed Digital TV Rollout is that many consumers expect to use their digital TV sets without set-top converters. There are many reasons why they have this expectation, but that is beside the point. They have that expectation and we want to provide service to meet those expectations. The only way to meet the consumer expectation of using a digital TV set without a converter requires that some digital signals are unencrypted. Otherwise, the consumer will need to use a set-top converter or install a CableCard.⁴ This observation may seem self-evident, but there is a very real threat to this expectation. Some program networks have attempted to force encryption of all digital programs.

It is important to recognize the difference among analog, Standard Definition (SD) and High Definition (HD) signals.

- o Analog signals are the most widespread. They are almost universally unencrypted. Any security required to limit access is done with physical traps installed (or removed) outside the home.
- o SD signals are very similar to analog signals. They are distributed widely and are largely unencrypted. Most cable companies ensure security of unencrypted SD signals with physical traps.
- o HD signals are different from both analog and SD signals. Other than the HD signals of broadcast TV stations, HD signals are almost universally encrypted. Therefore, an advanced set-top converter or CableCard is required to view them. A CAS provides this security.

A major difference between SD and HD signals is the need to protect them from unauthorized reproduction. The quality of SD signals is similar to analog. These signals are not highly desirable for illegal reproduction. HD signals, on the other hand, are highly desired for illegal reproduction. Thus, it is important to recognize the legitimate concern of program content owners to protect these valuable assets.

⁴ Virtually no digital TV sets are being manufactured with a CableCard option.



Massillon Cable TV, Inc.

One Connection. A World of Possibilities.

814 Cable Court N.W.
.....
Post Office Box 1000
.....
Massillon, Ohio
.....
44648-1000
.....

330-833-4134
.....
FAX 330-833-7522
.....

The ability to record digital signals is another concern among consumers. As with analog signals, consumers expect to be able to record digital programs for home use. This is not a major issue as the consumer electronics industry has incorporated CableCard technology into the current generations of digital video recorders (DVR). This allows legal recording of both SD and HD programs. Similarly, DVRs provided by MVPDs allow legal recording for home use while protecting the content owners.

The Threat to Unencrypted SD Programs

Some program providers have attempted to force encryption of all digital programs, both SD and HD. To date, we have successfully resisted demands to encrypt SD programs. This allows us to meet the expectations of digital TV owners to watch television without a converter. We have complied with requests from content owners to encrypt HD programming.⁵ This arrangement (unencrypted SD and encrypted HD) seems to meet consumer expectations. When they purchase a new digital TV set to replace an analog TV, they see the same programming in roughly the same quality without a converter – basically status quo.

Our experience is that most consumers expect to install some type of advanced set-top on their “main TV.” This will take the form of a Tivo, Moxi, Tru2Way TV or advanced set-top. Many customers want a DVR, Video-On-Demand and interactive applications. However, there are a great many people and a great many locations where an advanced, high-cost, large-profile, set-top simply doesn’t make sense. Yet, that is what consumers may face as their analog TV sets fail if content owners successfully press their demands to encrypt both SD and HD content.

Therefore we ask the Commission to consider whether it is in the best interest of consumers to require program networks to allow distribution of unencrypted standard definition signals and allow program networks to require distribution of encrypted High Definition signals. This would enable digital TV owners to use their advanced TV sets fully without unreasonably impinging on the rights of program distributors.

⁵ Not all HD content is encrypted. HD signals from broadcast TV stations are not encrypted. Some non-broadcast services, like QVC and HSN, request that their content remain unencrypted in order to reach the widest possible audience.



Massillon Cable TV, Inc.

One Connection. A World of Possibilities.

814 Cable Court N.W.

Post Office Box 1000

Massillon, Ohio

44648-1000

330-833-4134

FAX 330-833-7522

SUMMARY

Consumer Expectations Threatened

As part of Massillon's recently-completed project to eliminate all analog signals from our systems, we provided Digital-To-Analog set tops as a bridge so analog sets would continue to work in our new, all-digital world. These small set-tops enable consumers to keep using their 13" analog TV set in the kitchen or guest room without added expense. However, what is likely to happen when the legacy analog TV set fails? The customer is likely to visit a consumer electronics store and purchase a small digital TV set for less than \$200 to replace it. At a minimum, the customer will expect to continue to receive all of their current channels. Most likely, they also expect to see the HD versions of some networks. Imagine their surprise and frustration if they find their new, advanced, digital TV set is restricted to Lifeline service (about 20 unencrypted SD and 7 or 8 off-air HD signals) unless they pay a monthly fee and give up a couple square feet of counter space for an advanced set-top converter. With the current environment, this consumer will probably pay more than \$100 a year to receive HD programming on their \$200 TV set.

Under current conditions, this scenario is very likely because:

- o Continued pressure from program suppliers may cause virtually all SD and HD programs to be encrypted, and.
- o Absent SimulCrypt, we have only one supplier of set-top converters that can deliver SD and HD signals. These are expensive, advanced, two-way set-top converters.

It's a perfect storm that leads to fewer consumer options and higher monthly costs. The Commission should consider whether this scenario is in the best interest of the public.

CAS Alternatives Exist

Massillon believes there is an alternative which we call a Digital-To-HDMI converter. It is similar to the Digital-To-Analog converters we now use, but has a digital output in addition to an analog output. This would give consumers a low-cost option for linear SD and HD networks. It fills the void that currently exists between no set-top (and very limited service) and an advanced, two-way set-top (with access to unwanted services and a relatively high monthly cost).

There is an obstacle, however, to this application. As described above, it lies in the duopoly CAS market that currently exists in the US. At the present time Motorola and Cisco/Scientific Atlanta are the only major manufacturers of set-top boxes and, importantly, the CAS for those set-top boxes. Neither Motorola nor Cisco/Scientific Atlanta manufactures a low-cost, one-way



Massillon Cable TV, Inc.

One Connection. A World of Possibilities.

814 Cable Court N.W.
.....
Post Office Box 1000
.....
Massillon, Ohio
.....
44648-1000
.....

330-833-4134
.....
FAX 330-833-7522
.....

Digital-To-HDMI set-top. Instead, they only offer full-featured, high-cost, two-way set-tops. There simply is no choice. This doesn't have to be true.

Consumer Choice Is Possible

The adoption of policies that implement SimulCrypt and ensure access to unencrypted SD programming would lead to a continuum of consumer choice. It is important to note that these are not exclusive options. They can be co-mingled in the same home.

- o No set-top – a consumer could choose to use a digital TV set without a set-top converter. They would be able to view SD and HD programs; roughly the equivalent of Basic Cable service. This is what they receive now with their analog TV set. This would be the choice for TV sets in tight spaces, that are used infrequently or simply to save money.
- o Digital-To-HDMI set-top (or set-back) – a consumer could choose to use a low-cost, one-way, small-profile converter to receive linear SD and HD program services. Their program choices would expand to include a wider selection of HD content and optional services. This would be the choice for consumers who want more programming but have no interest in high-tech, interactive features.
- o Advanced Set-Top – a consumer could choose to use a fully-featured, two-way set-top with DVR, video-on-demand, pay-per-view and other services.

This continuum of consumer choice is only possible if both conditions (unencrypted SD programming and SimulCrypt) exist.

Respectfully Submitted,

Robert Gessner
President, Massillon Cable TV, Inc.

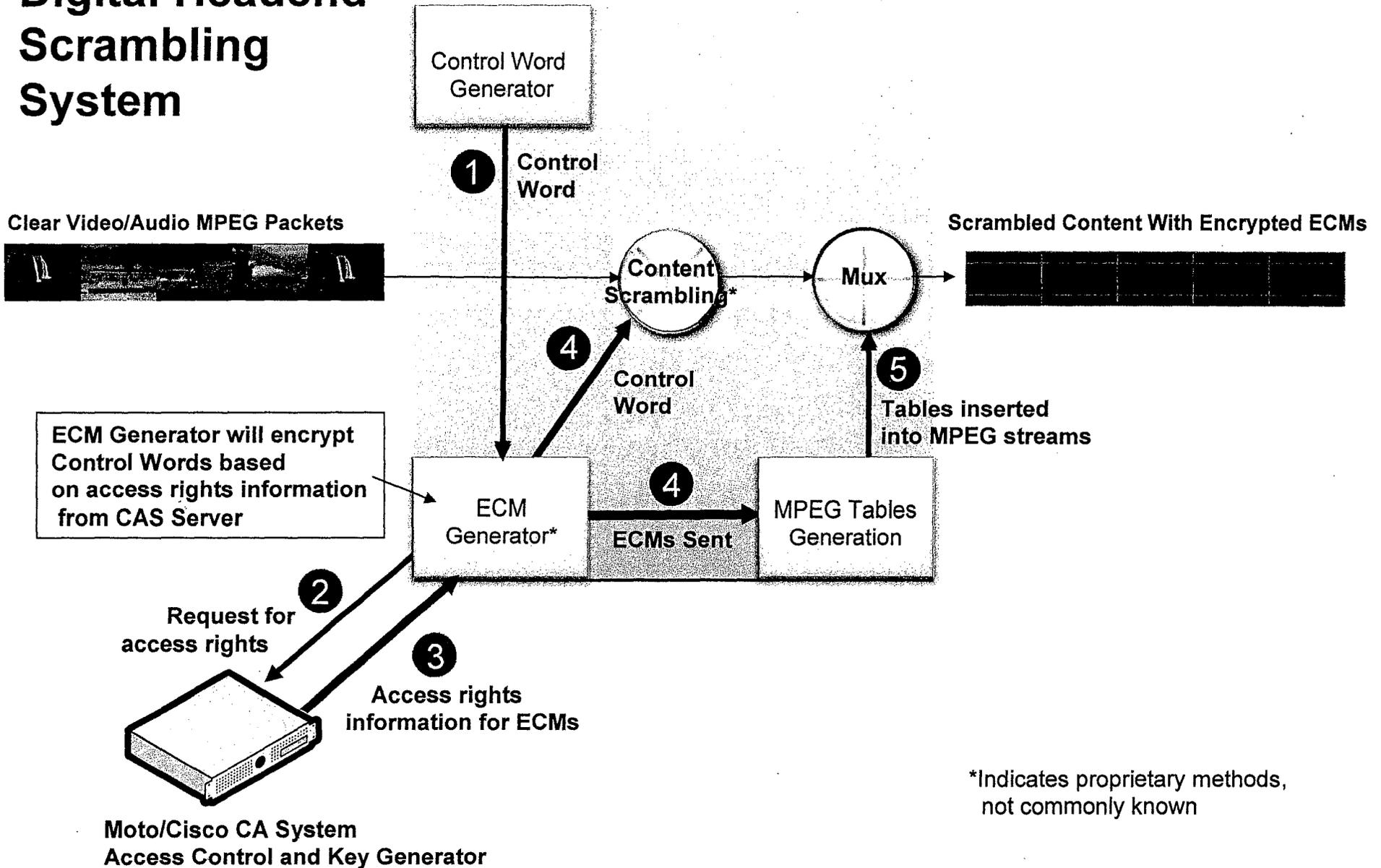
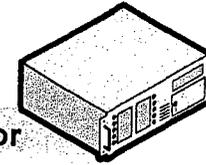
Cc: Brendan Murray (Media Bureau)
Steven Broeckaert (Media Bureau)
Nancy Murphy (Media Bureau)



Typical Digital Headend Scrambling System

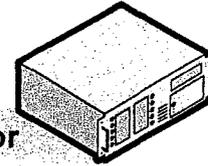
Scrambler Device

Typically, a multiplexer or QAM Modulator



Simulcrypt Digital Headend Scrambling System

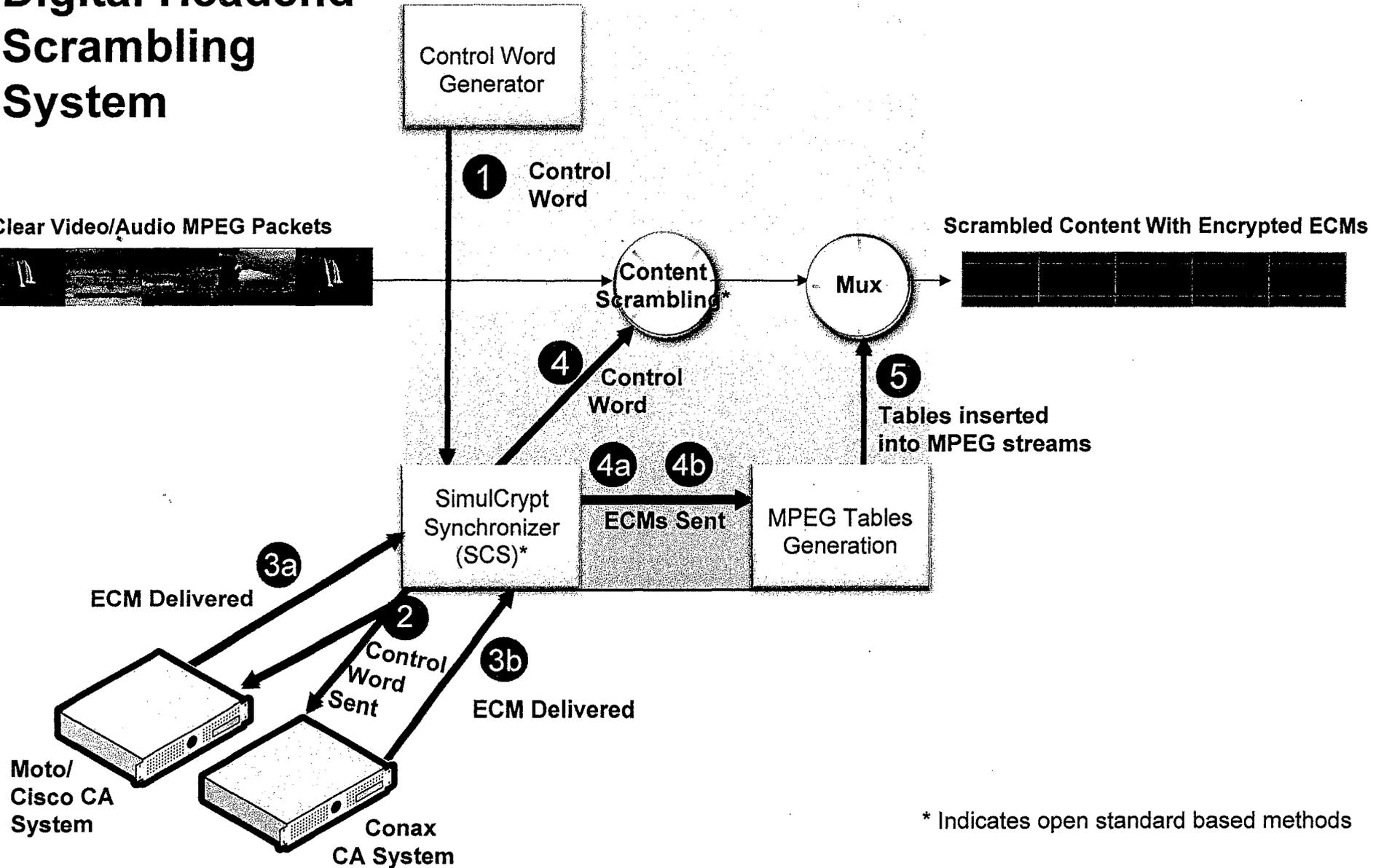
Scrambler Device
Typically, a multiplexer or QAM Modulator



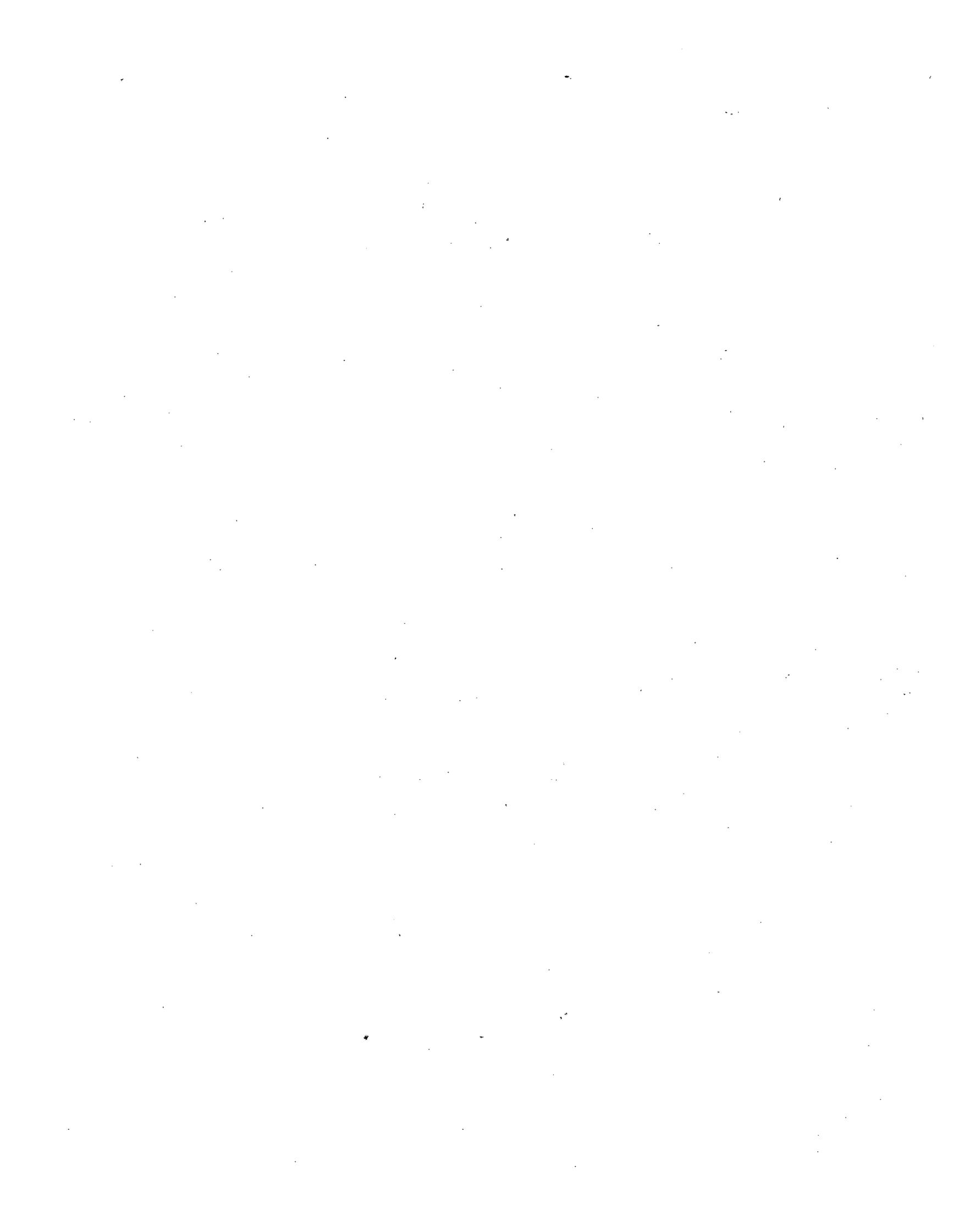
Clear Video/Audio MPEG Packets



Scrambled Content With Encrypted ECMs



* Indicates open standard based methods



Introduction to the DVB Project

Creating Global Standards for Digital Television

<http://www.dvb.org/>

DVB Fact Sheet – April 2009

What is the DVB Project?

The Digital Video Broadcasting (DVB) Project is an industry-led consortium of over 270 broadcasters, manufacturers, network operators, software developers, regulatory bodies and others in over 35 countries committed to designing open interoperable standards for the global delivery of digital media services. As DVB's name suggests, these include broadcasting. Services using DVB standards are available on every continent with more than 230 million DVB receivers deployed.

Included in this list are Motorola and Cisco.

Company Name	Member ID
Cisco Systems Inc.	50038
Motorola Inc.	50143

The Key Standards

The first phase of DVB's work involved establishing standards to enable the delivery of digital TV to the consumer via the "traditional" broadcast networks. Thus, the three key standards during this phase were DVB-S for satellite networks, DVB-C for cable networks and DVB-T for terrestrial networks. In addition to these, a whole range of supporting standards were required covering areas such as service information (DVB-SI), subtitling (DVB-SUB), interfacing (e.g. DVB-ASI), etc... Interactive TV, one of the key advances enabled by the switch from analogue to digital, required the creation of a set of return channel standards and the Multimedia Home Platform (MHP), DVB's open middleware specification.

Market Deployment

By any measure the DVB Project has been a success. More than 180 million devices around the world are receiving services that use DVB standards. Of these, about 100 million are satellite receivers and more than 60 million are receiving DVB-T signals. DVB-S forms the basis of digital satellite TV just about everywhere. DVB-C is the most commonly used system for digital cable TV. DVB-T has seen phenomenal growth in the last few years with services on air across Europe and in parts of Asia, with further launches to follow in Southeast Asia, Latin America and the EMEA region. The economies of scale engendered by such success mean that the prices consumers have to pay for receivers are falling all the time.



PRESS RELEASE

For Immediate Release

Contact: Harold Bergin
WHD Public Relations
P.O. Box 3035,
London SW1P 3BH
United Kingdom

Tel: +44 (0)20 7799 3100
E-mail: harold@whdpr.com

WORLDWIDE SUCCESS OF DVB REAPS UNPARALLELED BENEFITS FOR CONSUMERS

Economies Of Scale Generated By Huge Take Up Of DVB-T Creates Win-Win Situation For Manufacturers and Consumers Alike.

Las Vegas – 14 April 2008 – In the global transition to DTV, countries that have opted for DVB technology as the transmission standard of choice are benefiting from superior technology and quality of service at the lowest possible cost. With over 190 million DVB receivers of all kinds deployed across five continents consumers can avail of prices from as little as 20 USD. This mass market success applies equally to both consumer products and to professional equipment for transmission networks. Selecting DVB-T for the launch of digital terrestrial television services is increasingly an obvious choice for countries wishing to make the step to digital.

Currently DVB-T services are on air in more than 30 countries and the standard has been formally adopted in many more. All countries that are signatories of the Geneva 2006 (GE-06) Agreement governing radio frequency allocations will also use DVB-T, meaning that the standard will ultimately be deployed right across all the countries of Europe, Africa and the Middle East. DVB-T is being deployed widely in Asia and last year saw its first adoption in Latin America with Uruguay.

No other broadcast standard can offer the same level of economic benefit and affordability, key drivers for digital take up, as DVB-T. The enormous range of DVB-T receivers available in the marketplace today offer standard definition and high definition, interactivity and data services (MHP), MPEG-2 and MPEG-4 decoding, operating in 6, 7 and 8 MHz channel bandwidths, and with PAL and NTSC compatibility.

“DVB’s market led approach to open standards has ensured that economic and technical conditions allow countries to enjoy the benefits of digital TV. DVB-T is a worldwide success and continues to go from strength to strength. The road to digital may not always be an easy ride, but the right choice of technology can smooth the transition,” commented Peter MacAvock, Executive Director, DVB.

Worldwide Success Of DVB Allows Consumers To Reap The Benefits

Background

The DVB Project

The Digital Video Broadcasting Project (DVB) is an industry-led consortium of over 250 broadcasters, manufacturers, network operators, software developers, regulatory bodies and others in over 35 countries committed to designing global standards for the delivery of digital television and data services. The DVB standards cover all aspects of digital television from transmission through interfacing, conditional access and interactivity for digital video, audio and data. The consortium came together in 1993 to create unity in the march towards global standardisation, interoperability and future proofing.

To date, there are numerous broadcast services using DVB standards. There are hundreds of manufacturers offering DVB compliant equipment, which is already in use around the world. DVB dominates the digital broadcasting world. A host of other services is also on-air with DVB-T, DVB-S and DVB-C including data on the move and high-bandwidth Internet over the air. Further information about DVB can be found at: www.dvb.org.

DVB is registered trademark of the DVB Project.



MEDIA ADVISORY

For Immediate Release

Contact: Harold Bergin
WHD Public Relations
P.O. Box 3035,
London SW1P 3BH
United Kingdom

Tel: +44 (0)20 7799 3100
E-mail: harold@whdpr.com

DEFYING THE ECONOMIC DOWNTURN

DVB Economies of Scale Expected To Grow As Sales Of Receivers Continue To Rise

20 – 23 April 2009, LVCC, Booth C2239

Las Vegas – 20 April 2009 – The wide adoption of DVB's terrestrial standards across multiple territories and timetables positions them well against competing standards for future growth. This was the message delivered by the chief analyst of Digital Tech Consulting (DTC), a US based independent market research firm, to delegates at the recent DVB World 2009 conference in Berlin, Germany.

Terrestrial deployments are where DTC projects the greatest amount of growth in sales of digital TV receivers. Although current economic conditions are likely to keep growth modest, there are potential bright spots:

- Early stage developments for digital terrestrial TV rollouts in less developed territories such as Eastern Europe and India
- Individual government desires to clear spectrum
- Early market development of HDTV services in DVB territories.

According to DTC, DVB-T/DVB-T2 is projected to log the most growth among the established DTT transmission standards with the possible exception of China's home grown DTT technology. ATSC receivers shipped in record numbers in 2008 due to the impending analog switch-off in the US, and 2009 shipments will be strong, but growth will basically flatten after that with the exception of an increase when Canada makes its transition in 2011. ISDB-T has been officially adopted only in Japan and Brazil, minimizing its growth potential. The terrestrial module of the DVB family of standards is forecasted to significantly outperform those competing standards.

DVB's family of open standards is already deployed across 120 countries worldwide with more than 220 million receivers in use. With the cost of a DVB receiver now as low as 20 USD compared with the average cost of an ATSC receiver at 50 USD and ISDB-T receivers at 85 USD, the DVB option offers the opportunity to benefit from

Defying The Economic Downturn

the ever increasing economies of scale enjoyed by countries that have adopted DVB standards.

Background

The DVB Project

The Digital Video Broadcasting Project (DVB) is an industry-led consortium of over 270 broadcasters, manufacturers, network operators, software developers, regulatory bodies and others in over 35 countries committed to designing global standards for the delivery of digital television and data services. The DVB standards cover all aspects of digital television from transmission through interfacing, conditional access and interactivity for digital video, audio and data. The consortium came together in 1993 to create unity in the march towards global standardisation, interoperability and future proofing.

To date, there are numerous broadcast services using DVB standards. There are hundreds of manufacturers offering DVB compliant equipment, which is already in use around the world. DVB dominates the digital broadcasting world. A host of other services is also on-air with DVB-T, DVB-S and DVB-C including data on the move and high-bandwidth Internet over the air. Further information about DVB can be found at: www.dvb.org, www.dvb-h.org, www.mhp.org.

DVB is a registered trademark of the DVB Project.

Set-top Manufacturers with Conax CA Licenses

Motorola Ltd.

THOMSON Multimedia Digital France

Advanced Digital Broadcast SA

Hyundai Digital Technology Co. Ltd

Pace Micro Technology plc

Humax Electronics Co. Ltd

Samsung Electronics Co Ltd

Sharp Corporation

A2B Electronics AB

A2i Co., Ltd.

ALi Corporation

AMT Co., Ltd

Arion Technology Inc.

Askey Computer Corp.

Aston Group

Beijing Fosp Optoelectronics

Beijing Topreal Technologies Co., LTD

Beijing Unitend Technologies Inc.

Beyondwiz Co., Ltd.

Bharat Electronics Ltd.

Bitwise Technologies Ltd

CEC Huada Electronic Design Co., Ltd.

Celrun Co.,Ltd

CHENZHOU GOSPELL DIGITAL TECHNOLOGY CO., LTD

Cycle Century Digital Technology

DARI TECH Co., Ltd

Deltacom Electronics Ltd

DG2L Technologies India Pvt Ltd.

DGStation Co., Ltd.

Digital Telemedia Co., Ltd

DigitAll World Co.,Ltd.

Dizipia Inc.,

DMCAST CO., LTD.

Eagle kingdom Techn

Eastern Electronics Co., Ltd

Federal State Unitary Enterprise Frunze Factory

Fortis, Inc.

Fujitsu Microelectronics Europe GmbH

FULAN ELECTRONICS LTD.

General Satellite Trading Limited

GENIX InfoComm Co.,Ltd.

Global Technologies Inc.

GlobalSat Electronic Technology Limited

Golden Interstar GmbH

Handan Broadinfocom Co.,Ltd.

Himega Information Technology Co., Ltd.

Hisense Electric Co.,Ltd

Homecast Co., LTD.

Hub Tech Co., Ltd.
Infinite Stream Co., Ltd.
INTEK DIGITAL Inc.
Intercross LLC
Irumtek Co. Ltd.
JiangSu YinHe Electronics Co., Ltd.
Kaon Media Co.,Ltd
Kathrein-Werke KG
Kiryung Electronics Co., Ltd.
KONKA Group Co.,Ltd
Kreatel Communications AB
LaSAT Landkammer Satellitenempfangstechnik GmbH
LINETRON IP Ltd.
Marusys Co., Ltd.
Mascom GmbH Germany
Mico Technology (Shenzhen) Limited
Micronas GmbH
Mototech Inc.
MyBox Technologies Pvt. Ltd.
Nano-Space Co., Ltd
NEOTION SAS
Neta Elektronik AS
Ocilion IPTV Technologies GmbH
ONE-O-ONE iSOLUTIONS Inc.
OPENTECH INC.
Osmosys SA
Pacific Satellite International Ltd.
Prime Electronics & Satellitics Inc.
QINGDAO HAIER ELECTRONICS CO., LTD
Quantum Spa
Radix Inc.
SAGEM COMMUNICATION
Sandmartin (Zhong Shan) Electronic Co., Ltd.
SENERGY Ltd
Shanghai DareGlobal Info Tech Co.,Ltd.
Shenzehn Netelectronic Co., Ltd.
Shenzhen Advanced Video Info-Tech Co., Ltd.
Shenzhen Coship Electronics Co., LTD
ShenZhen Dehoo Technology Company Limited
ShenZhen Long&Tai Digital Technology Co.,Ltd
SHENZHEN MAIWEI CABLE TV EQUIPMENT CO.,LTD
SHENZHEN SOWELL TECHNOLOGY CO.,LTD.
Shenzhen State Micro Technology Co., Ltd.
SHENZHOUELECTRONIC CO.,LTD.
Sichuan Changhong Network Technologies Co.,Ltd.
Sichuan Jiuzhou Electronic Technology Co.,Ltd.
Skardin Industrial UK Ltd
Skyworth Digital Technology (Shenzhen) Co. Ltd.
SmarDTV SA
Star Communication Network Technology Co.,Ltd.

Stellar Interactive Media Pvt. Ltd.
Sunplus Technology Co.,Ltd.
TECATEL S.A.
TechniSat Digital GmbH
Telecard-Pribor, Ltd
Telegent GmbH
TELELYNX INC.
Telsey Spa
The Fortec Group Inc.
Tianjin Topbroad Microelectronics Co.,Ltd
TOEC TECHNOLOGY CO.,LTD
Topfield Co. Ltd
Triumph Technology CO.,LTD
Ubicod Co.,LTD.
UEC Technologies (Pty) Ltd
Vestel Komünikasyon Sanayi ve Ticaret A.Ş.
VICXON CORPORATION
VISSA ELECTRONICS SIA
Wela Electronic Handels GmbH
Winix Co., LTD.
Wisplus Inc.
Wistron NeWeb Corporation
WuHan High Dove Technology Vendor Co.Ltd
Yuxing Technology Company Limited
Zenterio AB

New Motorola Cable Headend Solution Readies Operators for High-Definition Roll-Out across Europe

Bandwidth enhancing solutions optimize cable networks to enable cost-effective distribution of HD content and accelerate delivery of personal media experiences

May 26, 2009

COLOGNE, Germany – ANGA Cable 2009 - May 26, 2009 – Motorola, Inc. (NYSE: MOT) today announced the launch of its new cable headend solution for the European market, progressing Motorola's strategy to empower its customers with more efficient, reliable, flexible and open standard headend architectures as they introduce bandwidth-hungry HD content.

Developed specifically in response to the growing consumer demand for High Definition (HD) content, Motorola's new cable headend solution meets today's requirements for more cost effective bandwidth optimization while providing flexibility for future growth. Bringing together Motorola's leading video products, the solution delivers the rate-shaping flexibility needed to simplify the deployment of HD channels in the cable network, especially as cable operators begin or expand their HD services with video on demand (VoD), network digital video recorders or time-shifted TV.

New to the platform is support for the DVB SimulCrypt Conditional Access standard, as well as full integration with DataMiner, Skyline's widely deployed multi-vendor network management platform. DataMiner offers easy management of the new Motorola products along with other key components of the cable ecosystem, providing operators with a comprehensive view and uniform interface to the health, status, and operation of their network.

Available immediately and showcased at the Motorola stand (E21) at the ANGA Cable Show 2009, in Cologne, Germany, May 26–28, 2009, the solution comprises the following:

- APEX1000 – a high density EdgeQAM that supports SimulCrypt-compliant conditional access
- REM1000 – a Redundant Edge Matrix delivering optimized system availability via APEX1000 redundancy
- New CAP1000 2.0 – CherryPicker® Application Platform with MPEG4 and MPEG2 rate shaping

"The joint release of new software and equipment for our cable headend solution demonstrates our commitment to addressing the dynamic European market," said Bob Wilson, vice president and general manager, Networked Video Solutions, Motorola. "Combining the benefits of our market leading CherryPicker technology and its new MPEG-4 rate shaping capability with the release of our SimulCrypt approved products means we have developed an integrated solution for our European cable operator customers that enables them to easily and efficiently introduce and expand their HD services."

Motorola has been a leader in digital video processing systems for nearly 20 years, having deployed more than 2,500 MPEG-2 and MPEG-4 digital headends as well as thousands of CherryPicker systems that optimize bandwidth and splice millions of ads every day around the world.

About Motorola

Motorola is known around the world for innovation in communications and is focused on advancing the way the world connects. From broadband communications infrastructure, enterprise mobility and public safety solutions to high-definition video and mobile devices, Motorola is leading the next wave of innovations that enable people, enterprises and governments to be more connected and more mobile. Motorola (NYSE: MOT) had sales of US \$30.1 billion in 2008. For more information, please visit www.motorola.com.



APEX1000

All-Purpose Edge QAM



Physical Chassis

1 RU chassis with support for up to 48 DRFI-compliant QAM channels, up to three removable and hot-swappable QAM modules per chassis (two block upconverted RF ports per QAM module)

QAM Modules

Available in 2x4 configuration (up to four QAM channels per port), 2x8 configuration (up to eight QAM channels per port), and a QAM module software upgrade to field-convert a 2x4 module to a 2x8 module

Power Consumption

Extremely low power consumption (<5 W/QAM channel when fully loaded, 240 W typical)

GigE Interface

Four GigE interfaces (SFP slots) with support for IGMPv3 and transport stream redundancy

Power Supplies

Supports up to two hot-swappable redundant load-sharing power supplies (system can operate with either one or two); supports two AC, two DC, or either 1 AC or 1 DC

Encryption and Conditional Access

- Supports full MediaCipher® encryption and conditional access as well as CTE for VOD scrambling in both MediaCipher and SCTE-52 modes
- Software upgradeable to CSA and AES encryption; capable of supporting third-party encryption through DVB Simulcrypt

Full Video EQAM Feature Set

- De-jittering of CBR and VBR input streams
- Receive either MPTS or SPTS
- Transmit MPTS
- Support for MPEG remultiplexing, PiD remapping, PSI generation, and PSI monitoring
- Software upgradeable to support PSIP fixing and SCTE-18 EAS
- Supports SNMP for configuration, control, alarms, and traps

SDV and VOD Standards

Supports the NGOD and TWC specifications

M-CMTS Standards

Software upgradeable to support the M-CMTS interfaces, including DTI, DEPI, and ERMI

The APEX1000 offers cost-effective and power-efficient multiplexing, encryption, and QAM/RF upconversion in a high-density platform.

High-Density EQAM for Full-Featured, Cost-Effective Video and Data Services

The APEX1000, Motorola's next-generation all-purpose edge QAM, provides flexibility, high availability, high QAM density, MediaCipher encryption, and low power in an extremely cost-effective 1 RU platform. Up to three removable and hot-swappable QAM modules can be installed in the chassis. Each module provides two RF ports, which support up to eight QAM channels each. Any of the 48 QAM channels available can be used for Video-on-Demand (VOD), Switched Digital Video (SDV), broadcast services, or DOCSIS® high-speed data (through support for the M-CMTS architecture).

The APEX1000 provides four SFP slots, allowing for up to four optical or electrical GigE inputs. This also allows the APEX1000 to support full transport stream redundancy covering all 48 QAM channels.

The APEX1000 supports the NGOD R6 and D6 interfaces as well as the TWC SDV interfaces, allowing it to function as an SDV edge QAM in any NGOD or TWC cable network.

In addition, the APEX1000 performs network de-jittering, MPEG multiplexing, message insertion, and PSI generation following MPEG-2 transport specifications.

SPECIFICATION SHEET

APEX1000
All-Purpose Edge QAM

MODULAR CHASSIS

Chassis Height	1 RU
Dimensions	1.7 in x 19.0 in x 24.9 in
Weight	23 lb (fully loaded)
QAM Modules	Up to three per chassis; purchase 2x4 or 2x8 modules; software upgrade 2x4 to 2x8
Hot-Swappable	Yes
RF Ports	Two per QAM module
QAM Channels per RF Port	
2x4 module	Up to four
2x8 module	Up to eight

POWER

Power Supplies	Up to two per chassis
Load Sharing	Yes
Redundant	Yes
Hot-Swappable Configurations	Yes
	One or two AC
	One or two DC
AC Power Supply	100 to 240 VAC, 50/60 Hz
DC Power Supply	-40 to -75 VDC
Power Consumption	<5 W/QAM channel fully loaded (240 W typical)

ENVIRONMENTAL

Operating Temperature	0 °C to 40 °C
Storage Temperature	-40 °C to 70 °C
Cooling	Five fans, front-to-back airflow
Operating Humidity	5% to 95%

FEATURES

Broadcast Video VOD/SDV	Supported
	NGOD, TWC, and UDP port mapping configurable on a per-QAM-channel basis
M-CMTS Encryption and CA	DEPI, DTI, ERM1
	MediaCipher and SCTE-52, Broadcast and CTE (for VOD); upgradable CSA and AES encryption and DVB Simulcrypt
Configuration/Control	Element Manager (SNMP), Motorola SDM (SNMP), console port (RS-232)

GIGABIT ETHERNET INPUT/OUTPUT

GigE MPEG Data	Receive only
Physical Ports	Four SFP slots
IGMPv3	Supported
Optical SFP Support	850, 1310, 15xx nm
Electrical SFP Support	1000Base-T

FAST ETHERNET INPUT/OUTPUT

Physical Ports	Two RJ-45 Ethernet
----------------	--------------------

RF OUTPUT

ITU J.83 Annex A, B, C; DRFI	
QAM Constellations	256 QAM and 64 QAM
Center Frequency Range	57 to 999 MHz
Carrier Frequency Step Size	250 KHz
RF Level Step Size	0.2 dB
Maximum RF Output Level	
One active channel	60 dBmV
Two active channels	56 dBmV
Four active channels	52 dBmV
Six active channels	50 dBmV
Eight active channels	49 dBmV
Input Impedance	75 Ω

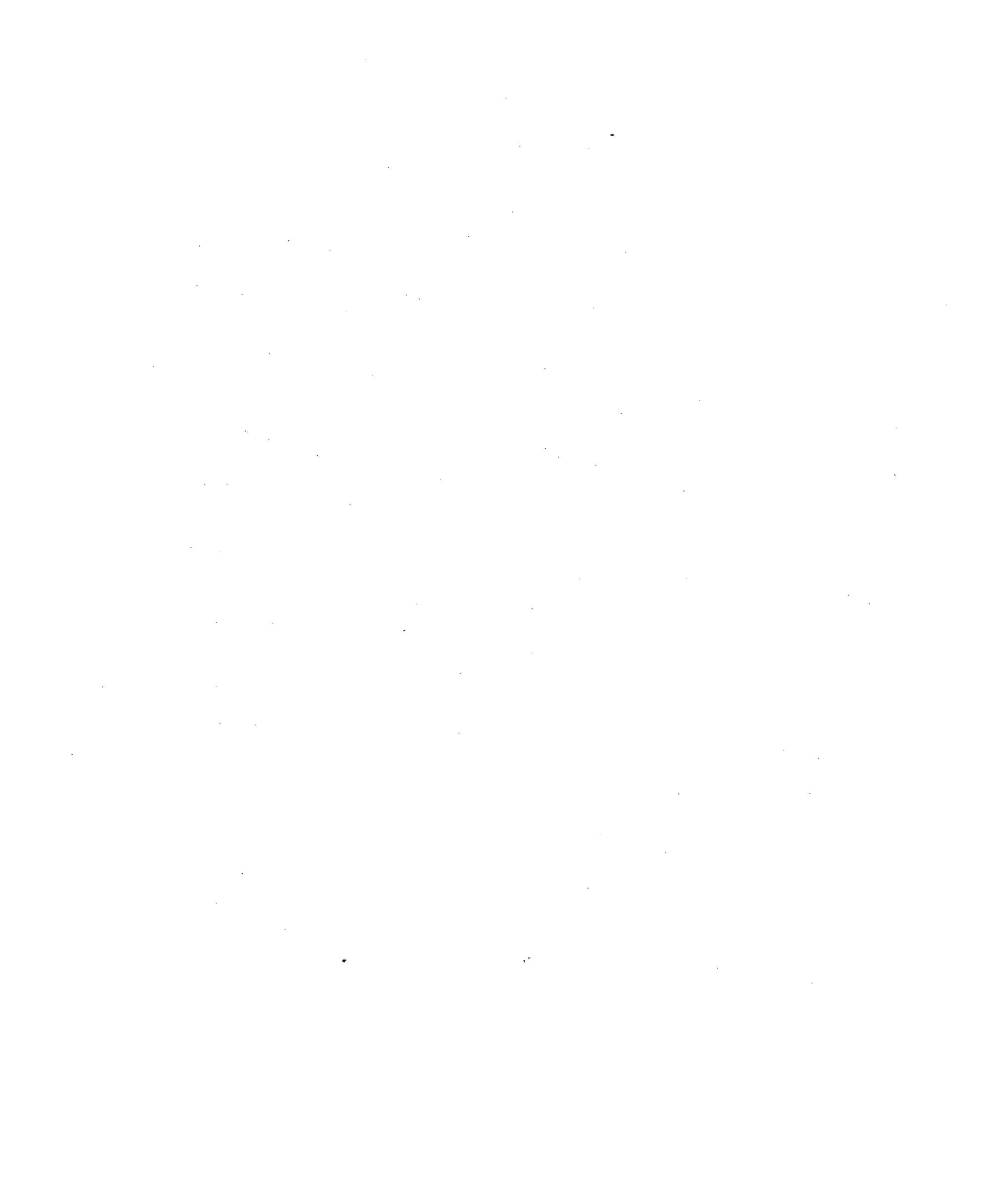
Component	Description	Part Number
APEX1000 Chassis	QAM modules and power supply modules sold separately	540274-001
QAM Module (2x4)	Two RF ports per module enable up to four QAMs per port	540273-001
QAM Module (2x8)	Two RF ports per module enable up to eight QAMs per port	540273-002
Power Supply Module (AC)	AC power supply	540272-001
Power Supply Module (DC)	DC power supply	540271-001
APEX1000 V48 AC	Includes one APEX chassis, one AC power supply module, three 2x8 QAM modules	541928-001
APEX1000 V48 DC	Includes one APEX chassis, one DC power supply module, three 2x8 QAM modules	541928-002
APEX1000 V24 AC	Includes one APEX chassis, one AC power supply module, three 2x4 QAM modules	541928-003
APEX1000 V24 DC	Includes one APEX chassis, one DC power supply module, three 2x4 QAM modules	541928-004
QAM Module Upgrade	Field convert a 2x4 QAM module to a 2x8 QAM module	540430-001



MOTOROLA

Motorola, Inc. 101 Tournament Drive, Horsham, Pennsylvania 19044 U.S.A. www.motorola.com

MOTOROLA and the Stylized M Logo are registered in the U.S. Patent and Trademark Office. MediaCipher is a registered trademark of General Instrument Corporation, a wholly-owned subsidiary of Motorola, Inc. DOCSIS is a registered trademark of Cable Television Laboratories, Inc. All other product or service names are the property of their respective owners. © Motorola, Inc. 2008. All rights reserved.



Possible Paths for Digital TV Use

As analog TV sets fail, consumers must purchase digital TV sets. The elimination of analog TV sets will further encourage cable operators to recapture analog spectrum to launch more HD networks and other advanced services.

This process is self-actualizing. As the number of analog channels declines, consumers with analog TV sets will be more likely to abandon their analog TV set in favor of a digital TV set.

Those that remain analog will need converters to keep those analog TV sets working. Low cost digital-to-analog converters will keep these sets working until they finally fail and are replaced by digital TV sets. This is the only path for analog TV use: a declining number of available analog signals that can be maintained or increased with a low-cost converter. The eventual outcome for all analog TV users, however, is the same. They must eventually replace the analog TV set with a digital TV set.

While only one path is available for the demise of analog TV sets, multiple paths for consumer use of digital TV sets exist. They depend on the existence (or absence) of Clear QAM signals and SimulCrypt for conditional access to encrypted signals.

No change

Without Clear QAM, programmers will start to require encryption of SD program networks. Cable operators will be forced to comply and consumers with digital TV sets will receive fewer and fewer digital channels without a converter. This means a converter will eventually be required on every digital TV set to receive any level of service above lifeline networks.

The frustration of having no choice but to use a converter will be exacerbated by the fact that, without SimulCrypt, the current marketplace of proprietary conditional access systems and converter supply will keep converter price high and varying converter options low.

With Clear QAM, but no SimulCrypt

With Clear QAM, consumers with digital TV sets receive more and more channels without a converter as cable operators launch new SD networks. This will give consumers a choice between

- With no converter, a broad SD service offering and a few HD channels – very similar in nature to their previous analog service or
- With a converter, a complete suite of digital services including broad SD and HD offerings, interactive program guide, access to PPV, VOD, premium movie networks and other two-way services – very similar to the service offering available today.

However, without SimulCrypt, consumers who choose to install a converter will find that prices remain high and converter options remain low.

Without Clear QAM, but with SimulCrypt

Without Clear QAM, programmers will start to require encryption of SD program networks. Cable operators will be forced to comply and consumers with digital TV sets will receive fewer and fewer digital channels without a converter. This means a converter will eventually be required on every digital TV set to receive any level of service above lifeline networks.

SimulCrypt will enable cable operators to install competing, non-proprietary conditional access systems. Competing vendors can offer a wide range of converters with varying price points and features. Lower converter costs and varying feature options can be passed to consumers. This will allow a choice among:

- With no converter, a very limited number of SD channels and a few HD networks – similar to the current Lifeline or Broadcast Basic service level.
- With a low-cost, one-way converter, a broad offering of linear SD and HD networks supported by a limited non-interactive program guide, but without advanced features like interactive program guides, PPV, VOD, and other two-way services.
- With an advanced, two-way converter, a complete suite of digital services including broad SD and HD offerings, interactive program guide, access to PPV, VOD, premium movie networks and other two-way services – very similar to the service offering available today.

The frustration of being required to use a converter will be partially ameliorated by an increased selection of converter prices and options.

With Clear QAM and SimulCrypt

With Clear QAM, consumers with digital TV sets receive more and more channels without a converter as cable operators launch new SD networks.

SimulCrypt will enable cable operators to install competing, non-proprietary conditional access systems. Competing vendors can offer a wide range of converters with varying price points and features. Lower converter costs and varying feature options can be passed to consumers. This will allow a choice among:

- With no converter, a broad SD service offering and a few HD channels – very similar in nature to their previous analog service or
- With a low-cost, one-way converter, a broad offering of linear SD and HD networks supported by a limited non-interactive program guide, but without advanced features like interactive program guides, PPV, VOD, and other two-way services.

- With an advanced, two-way converter, a complete suite of digital services including broad SD and HD offerings, interactive program guide, access to PPV, VOD, premium movie networks and other two-way services – very similar to the service offering available today.

With SimulCrypt, a robust competitive market will emerge among numerous converter and conditional access providers. This competition will bring new designs and functionality as well as lower prices from both the existing providers and the new entrants.

Tru2Way and DCAS (Downloadable Conditional Access Systems) are not universal solutions.

Tru2Way holds great promise for ending the reliance on converters. The presence of Clear QAM signals and competing conditional access systems does not inhibit Tru2Way or DCAS.

However, it is important to remember that many Tru2Way sets will rely on a “set-back” converter to provide decryption. This adds cost and does not ensure against obsolescence. Consumers will still need to choose between a set-back converter (for Tru2Way) and a traditional set-top converter. SimulCrypt (and the creation of a competitive converter market) will help reduce costs whether for a set-back converter or a set-top.

More importantly, Tru2Way will add cost so not every TV set purchased will include Tru2Way capability. Tru2Way may be cost prohibitive on smaller sets (typically found in kitchens, guest rooms and other low-use installations) or simply be too expensive or advanced for the use of many consumers. Therefore, many consumers will still be faced with the difficult choice between extremely limited service without a converter and expensive service with a converter. Clear QAM will improve this choice by ensuring a broad SD service offering without a converter and without the need for an expensive Tru2Way set.

Options for Digital TV Future

	CLEAR QAM	NO CLEAR QAM
S I M U L C R Y P T	<p style="text-align: center;"><u>AVAILABLE PROGRAM NETWORKS</u></p> <p>Without a converter</p> <ul style="list-style-type: none"> ○ SD – wide selection (100+) ○ HD – modest selection <p>With a converter</p> <ul style="list-style-type: none"> ○ Full range of SD, HD and advanced services <p style="text-align: center;"><u>CONVERTER OPTIONS</u></p> <ul style="list-style-type: none"> ○ Multiple manufacturers/non-proprietary CAS ○ Varying price points and feature options. <p style="text-align: center;"><u>TRU2WAY & DCAS</u></p> <ul style="list-style-type: none"> ○ Available. <p style="text-align: center;">THIS IS WHERE I WANT TO BE</p>	<p style="text-align: center;"><u>AVAILABLE PROGRAM NETWORKS</u></p> <p>Without a converter</p> <ul style="list-style-type: none"> ○ SD – narrow selection (<50) ○ HD – modest selection <p>With a converter</p> <ul style="list-style-type: none"> ○ Full range of SD, HD and advanced services <p style="text-align: center;"><u>CONVERTER OPTIONS</u></p> <ul style="list-style-type: none"> ○ Multiple manufacturers/non-proprietary CAS ○ Varying price points and feature options. <p style="text-align: center;"><u>TRU2WAY & DCAS</u></p> <ul style="list-style-type: none"> ○ Available.
N O S I M U L C R Y P T	<p style="text-align: center;"><u>AVAILABLE PROGRAM NETWORKS</u></p> <p>Without a converter</p> <ul style="list-style-type: none"> ○ SD – wide selection (100+) ○ HD – modest selection <p>With a converter</p> <ul style="list-style-type: none"> ○ Full range of SD, HD and advanced services <p style="text-align: center;"><u>CONVERTER OPTIONS</u></p> <ul style="list-style-type: none"> ○ Single manufacturer/proprietary CAS ○ Limited price points and feature options. <p style="text-align: center;"><u>TRU2WAY & DCAS</u></p> <ul style="list-style-type: none"> ○ Available. 	<p style="text-align: center;"><u>AVAILABLE PROGRAM NETWORKS</u></p> <p>Without a converter</p> <ul style="list-style-type: none"> ○ SD – narrow selection (<50) ○ HD – modest selection <p>With a converter</p> <ul style="list-style-type: none"> ○ Full range of SD, HD and advanced services <p style="text-align: center;"><u>CONVERTER OPTIONS</u></p> <ul style="list-style-type: none"> ○ Single manufacturer/proprietary CAS ○ Limited price points and feature options. <p style="text-align: center;"><u>TRU2WAY & DCAS</u></p> <ul style="list-style-type: none"> ○ Available. <p style="text-align: center;">THIS IS WHERE WE ARE TODAY</p>