

THWARTING THEFT



Copy protection for digital networks in Asia



BY THOMAS H. CARROUX

THE launch of digital networks throughout Asia means the number of distribution channels available to copyright owners has multiplied significantly. System operators such as DaCom, DIRECTV Japan, Indovision, Hongkong Telecom, JSkyB, MEASAT, PerfecTV!, Singapore Telecom, ThaiSky and Wharf Cable are either expanding or launching digital video networks.

In any new, emerging distribution channel, the key issue is to grow the new business aggressively, but to simultaneously protect the existing business. In this equation, copy protection is one of the key elements. Digital distribution increases the profit potential for copyright owners — especially movie studios — provided the risk of revenue loss due to unauthorized home taping is controlled.

Today, movie studios benefit from the \$30 billion-a-year worldwide home video market where consumers either buy or rent videotapes. In either case, the movie studio profits from the up-front cash payment received from wholesale distributors or retailers. In the case of a rental videotape, the movie studio typically receives \$60 for each tape, regardless of the number of times the tape is rented. For a typical movie, the tape may be rented 100 times or more. Clearly, the movie studio would like to participate in the rental revenue rather than just receive a one-time payment.

Pay-Per-View And Video-On-Demand

PPV and VOD offer the potential of providing a more efficient and profitable distribution channel for movie studios. The problem with analog networks has been system operators are reluctant to invest in addressable set-top equipment,

and the limited number of analog channels either prevents a system operator from offering VOD programming, or offering only a few PPV movies infrequently.

Compressed digital video and sophisticated electronic program guides have made it possible for system operators to show more movies on multiple channels with more frequent start times, all of which translates into high PPV and VOD buy-rates. In PPV, the retail price paid by the individual subscriber is divided between the system operator and the copyright owner, with the copyright owner usually receiving 50 to 60 percent of the retail price or a minimum of \$2, whichever is greater.

Home copying of digitally distributed programming reduces several revenue streams. Each time someone makes a copy of a specific program, the copyright owner loses at least one PPV, VOD or home video transaction. Additionally, for each unauthorized copy made, the value of downstream subscription pay-TV and syndication is diminished. Anti-copy processes can protect against these losses. In 1996,

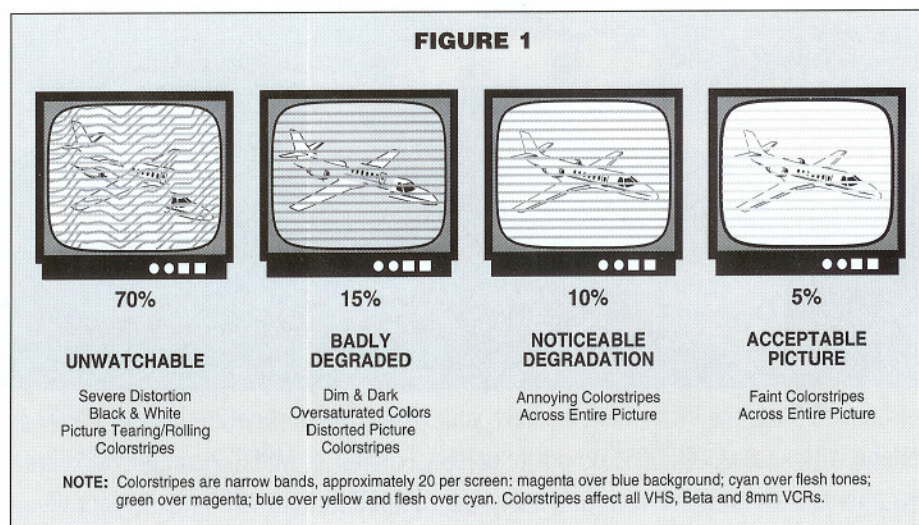
Chilton Research published a study indicating 24.6 percent of the surveyed PPV households taped movies. Without copy protection, there is virtually nothing preventing consumers from acquiring movies for the price of a blank tape.

Copy protection of digitally transmitted programming is particularly important, in that the quality of the copy is equal to commercial video cassettes provided by retailers. Degradation in picture and sound quality is only somewhat noticeable in second generation copies.

Copy Protection Technology

With hundreds of millions of dollars at stake it makes sense to look at the experience of Asian system operators who have deployed copy protection in their digital networks. Hongkong Telecom, PerfecTV! and Singapore Telecom have licensed Macrovision's anti-copy technology. Other system operators have specified copy protection technology in the digital set-top decoders used within their video networks. Currently, 35 set-top manufacturers incor-

FIGURE 1



porate Macrovision's technology within their set-tops.

Anti-Copy Through An IC

The anti-copy process is emitted by an integrated circuit (IC) within the digital set-top. The IC converts digitally compressed video into standard NTSC or PAL analog output, then routes the signal to the consumer's analog TV. The IC also applies Macrovision's anti-copy process which consists of two parts.

The first part consists of a sequence of white pulse and pseudo-sync pulse pairs applied to several lines of the vertical blanking interval that are not detected by the TV's automatic gain control (AGC) circuit. However, when a videocassette copy

is made, the pulses confuse the VCR's AGC circuit, causing the VCR to react to the video signal as if it were several times its actual intensity. The VCR responds by lowering the input level or gain and recording dim, noisy pictures with loss of color and/or loss of vertical hold.

In the second part of the anti-copy process, the color burst is inverted 180 degrees following a sequence of approximately four out of every 20 lines. This

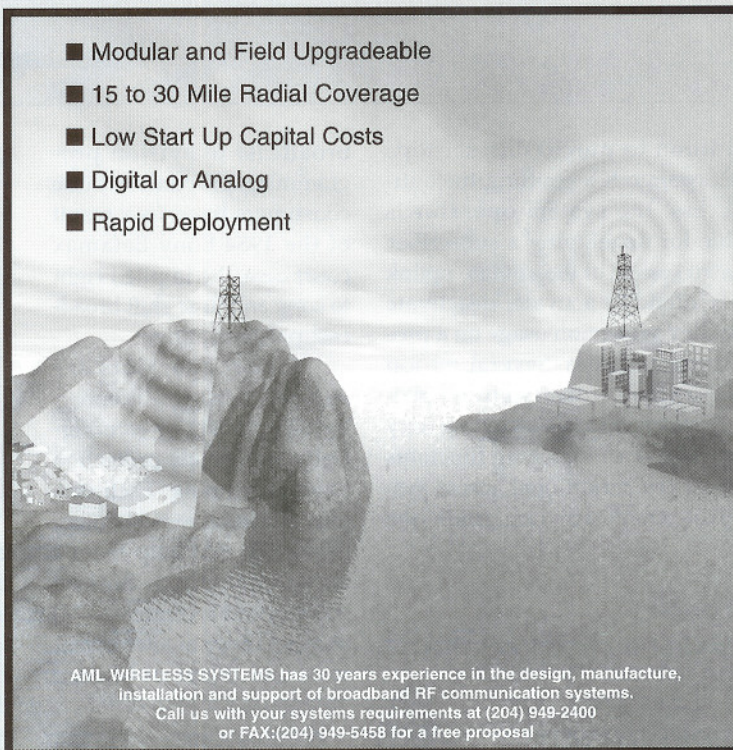
Colorstripe™ process is not sensed by TVs, but confuses a VCR's color processing circuitry to record annoying horizontal bands of complementary color which appear when unauthorized copies are played back. The net effect of the modified video signal is that the TV will display a normal, transparent picture of copy protected programming distributed by a set-top, but any copies made on a VCR will display severe distortion (see Figure 1).

Set-Top Manufacturers Licensed by Macrovision

Apple Computer
AT&T Network Systems
Daewoo Electronics
Daichiikoshio
DiviCom
DX Antenna
EchoStar
General Instrument
Hewlett Packard
Hitachi
Hughes Network Systems
Hyundai Electronics America
Maspro Denkoh
Matsushita Electric
Mitsubishi Electric
NEC
Nippon Antenna
NokiaOnline Media
Pace Micro Technology
Philips Consumer Electronics
SAGEM
Samsung Electronics
Sanyo Electric
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Yagi Antenna
Zenith Electronics

Broadband Transmitters and Repeaters for MMDS

- Modular and Field Upgradeable
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- Digital or Analog
- Rapid Deployment



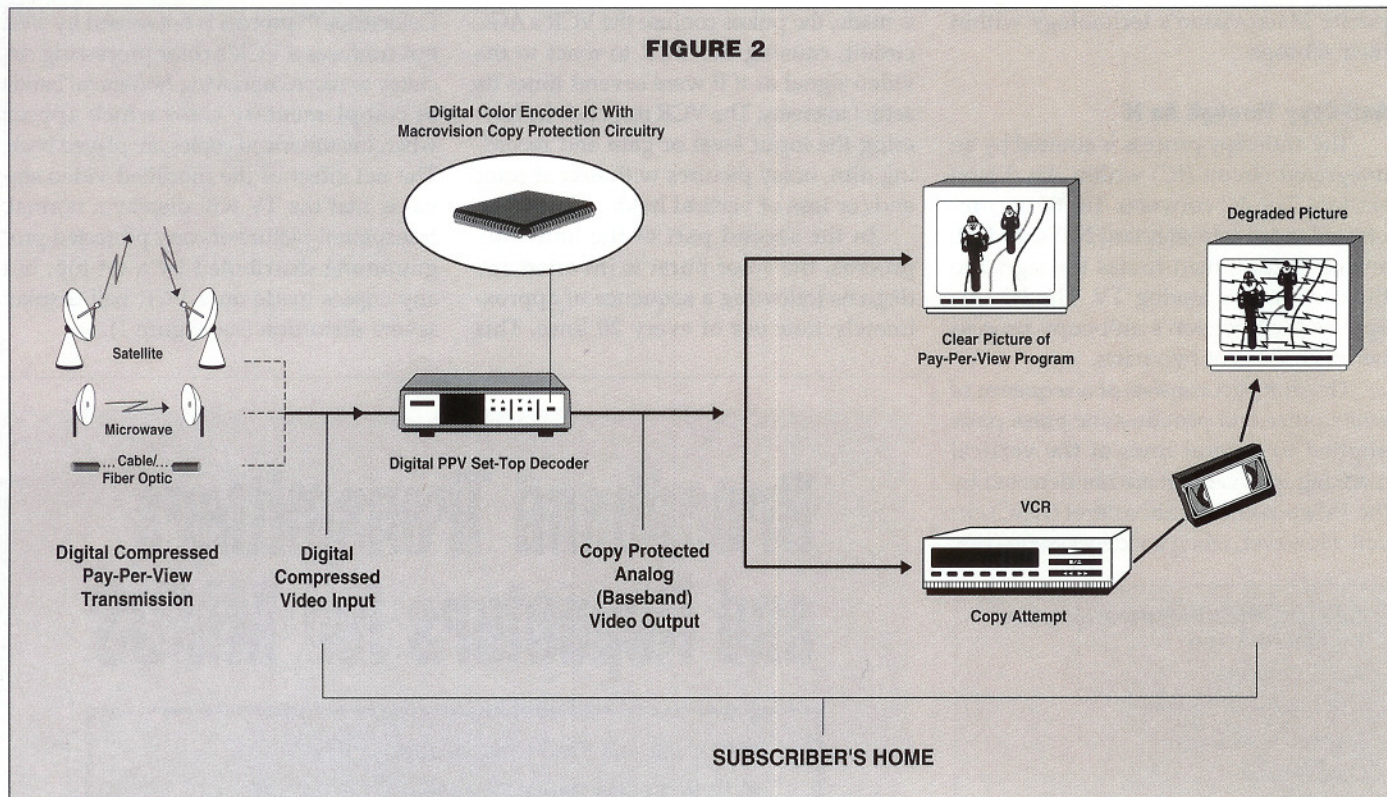
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Circle 7 on Reader Service Card

FIGURE 2



In addition to purchasing set-tops which incorporate ICs emitting the anti-copy process, the system operator is responsible for developing a subscriber management system at the satellite uplink or cable headend to activate, deactivate and track copy protection usage on a program-by-program basis. Several set-top manufacturers have written software platforms for turnkey networks including copy protection control and tracking functions within either the conditional access system or the electronic program guide (see Figure 2).

Licensing Model

Purchasing copy-protection-enabled set-tops is a necessary, but less than sufficient measure taken to operate a copy-protection-ready network. Macrovision licenses its patented copy protection technology to IC manufacturers, set-top decoder manufacturers and system operators. In each of the technology platforms, Macrovision provides engineering and quality control.

Macrovision limits the use of copy protection to PPV, VOD and pay-TV programming. The company does not allow the application of copy protection on

broadcast television programming, primarily because consumers have, as a result of the 1984 Sony Betamax court case, the implied right to copy and time-shift broadcast programming.

System operators are required to become licensees in order to test or commercially apply copy protection to programming. Each system operator expects copy protection will help them acquire popular programming, thus attracting subscribers and increase revenues. Copy protection is only available within digital set-tops, and therefore offers digital system operators a tool to differentiate their programming from that offered by analog competitors. The cost of applying copy protection to specific programs may be paid for by the copyright owner; alternatively the system operator might elect to pay these royalties in order to obtain early release hit-programs from the copyright owners.

Use Of Copy Protection

In Oct. 1996, PerfecTV! became the first system operator to commercially apply copy protection to programming. PerfecTV!



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PHOTO: C. CHRISTOPHER SEMMES

currently has over 236,000 DBS subscribers in Japan and is applying Macrovision's anti-copy process to seven channels of pay television and PPV programming. In addition, Hong-kong Telecom and Singapore Telecom have licensed copy protection technology to safeguard the VOD programming distributed to their trial system subscribers. Singapore Telecom copy protects all VOD programming.

Copy Protection Needs Will Grow

As the number of digital video networks increase in Asia and throughout the world, the value of protecting downstream programming revenue from the cannibalization of unauthorized copying becomes increasingly important to the integrity of our industry. **W**

About the Author...

Thomas H. Carroux is director of business development for Macrovision Corp. At Macrovision, Carroux is responsible for licensing the company's copy protection technology to system operators in North America and specific Asian countries.

