DRAKE

SCTE Cable-Tec Expo® 2009 Paper

Title: *Next-Gen Room Service: Cable's HD Hospitality Opportunity*

Business Services Track

Workshop Title: Premises-Based Business Services

Description: New services to certain businesses require installation of specialized equipment at the customer's location. The migration to digital video is not limited to the residential market. Hospitality purveyors require a solution for bulk decryption and distribution of HD video. Such a network could be used to provide Digital Video and On-Demand services to a new set of customers. Additionally, wireless LANs have become a standard amenity in many businesses, both in hospitality and otherwise. While both of these services traditionally may have come from separate providers, cable has an opportunity to serve both.

Coordinators: Jack Burton and Mike Hayashi

White Paper Summary: MSOs are increasingly seeking new revenue-generating opportunities in the commercial arena. One large segment of this is the Hospitality market, comprising hotels, hospitals, and other private networks. While MSOs have been offering bulk analog video services to these networks for some time, the introduction of large screen HD televisions into many hospitality properties is leading these networks into a 'digital transition' of their own. This paper will map out the technical challenges facing operators seeking to secure or increase their foothold on local hospitality video services and, at the same time, identify how technical advancements will enable providers to better market digital products (like HD and VOD) to the hotel industry while providing added value beyond that of competitive services. Specifically, this discussion will expand upon the technical advancements driving development of compact, high density onsite bulk transcryptor systems and remote maintenance capabilities. Additionally, designing systems to operate within switched digital network environments, access cable VOD libraries, and offer customization opportunities for hospitality customers present added challenges and will also be addressed in this paper.

Author & Presenter:
Jeffrey R. Huppertz
President & CEO
Drake
230 Industrial Drive
Franklin, OH 45005
jhuppertz@drakedigital.com

Next-Gen Room Service: Cable's HD Hospitality Opportunity

2009 SCTE Cable-Tec Expo® Technical Paper

By Jeffrey R. Huppertz • President & CEO • Drake

230 Industrial Drive • Franklin, OH 45005
jhuppertz@drakedigital.com

Next-Gen Room Service: Cable's HD Hospitality Opportunity

Cable operators are rolling out high-definition (HD) programming at a break-neck pace to an audience hungry for more and more HD content. As consumers' rapid adoption of HDTV technology fuels growing expectation of its availability away from the home, it's no shock the hospitality market (hotels, hospitals, etc.) is emerging as *the* premier revenue driver for Cable's commercial video services.

Hotels in particular today are demanding one thing from their video provider: HD content for not only local broadcast channels, but also basic and premium cable channels. Both new and old competitors in the video services arena are actively targeting hospitality customers boasting advantages over Cable, specifically broader HD channel lineups. However, as the leading provider of localized community programming, cable operators are well positioned to grow their hospitality service offerings going forward.

State of the Hospitality Union: Free-to-Guest is Where It's At!

With 98% of hotel guests watching television at least once during their stay[1], today's changing "Free-To-Guest" video service landscape holds more opportunity than ever for Cable.

In the 'good old days' of analog television, cable operators simply needed to provide a lineup of basic cable and broadcast channels, plus one or two premium channels (such as HBO) to a hotel or hospital premise directly off of their residential hybrid-fiber coaxial (HFC) system. Little if any equipment was needed at the property, other than signal amplifiers. This guest room television service is commonly referred to as "Free-To-Guest", as it's provided at no extra charge to the hotel guest or health-care patient.

Hospitality Pay Per View systems were initially deployed in the 1980s by Spectradyne among others, and soon became lucrative sources of revenue for hotels given their captured audience. Video On Demand (VOD) systems were developed in the '90s by full service integrators like LodgeNet/OnCommand, who later added interactive services such as video games, internet-via-TV, and in-room checkout.

While watching a recent blockbuster movie was a big-hit among travelers for almost two decades, today the in-room VOD party is beginning to end due to the combination of high-speed-internet access and guest-owned laptops. From 2007 to 2008, the decline in Guest VOD, gaming, and internet-TV revenues approached 10%[2]. More recently, VOD revenues on a per-room-basis declined by an astounding 20% when comparing the first quarter of 2008 to the first quarter of 2009 (though certainly the overall economy played a role).[3]

---

[1] LodgeNet Interactive Corp, *Consumer Needs Market Assessment*, August 10, 2007
[2] LodgeNet Interactive Corp, *2008 Annual Report*, March 13, 2009.
[3] LodgeNet Interactive Corp, *First Quarter 2009 Form 10-Q*, 8-May-2009

On top of this decrease in Guest VOD revenues, the complexities for cable operators in offering a hotel-VOD service are daunting. They include[4]:

a) Different VOD windows for hotel PPV titles vs. residential PPV titles

b) Different pricing per movie for hotel vs. residential

c) Different menuing and branding of the hotel VOD system vs. residential

d) Hotel restrictions on cable set-top box placement in guest rooms

e) Cable billing system integration with hotel billing system (aka "double post accounting")

While Guest VOD may be declining in attractiveness, Free-To-Guest television is enjoying a strong resurgence thanks to a widespread industry adoption of quality flat-panel HDTVs and corresponding transition to compelling HD programming services to complement them. HD content is all the rage today, and hospitality owners are eager to gain an advantage by bringing more HD channels to their guests than nearby competitors.

Hospitality properties are deploying flat-panel HDTVs en-masse. Key drivers for this include reclamation of valuable room space, energy savings, more attractive amenities resembling modern home environments, and an overall higher quality guest/patient experience.

Commercial services candidates with multi-screen environments similar to hotels and hospitals include:

- Assisted living facilities
- Schools / Universities
- Military bases / other government facilities
- Corporate Offices
- Health clubs
- Bars / restaurants
- Airports

Under current market conditions, Cable's immediate hospitality opportunity has shifted from Guest VOD to Free-To-Guest HD basic and premium programming. Over the same 2008-2009 period that hotel VOD services declined over 20%, hotel per room Free-To-Guest revenues climbed 13%, due to the installation of high definition capability in a growing number of rooms. Results today show Free-To-Guest service revenues are 30% higher to the video service provider for an HD-enabled hospitality property than for SD / analog properties.[5] When bundled with high-speed-data and cable voice services, the same compelling trio that appeals to Cable's residential audience can be applied to hospitality.

---

[4] Communications Technology, *Cable and Hotels: Why and How to Serve this Market,* by Glen Hardin, Time Warner Cable,
 April 1, 2008
[5] LodgeNet Interactive Corp, *Noble Financial Fifth Annual Emerging Growth Equity Conference*, June 8, 2009

Sizing Up Cable's Opportunity

The US hospitality market consists of almost 50,000 hotels[6] and approximately 6,000 hospitals[7] – each requiring content to complement their current or impending investment in HDTVs – representing huge revenue potential for the cable industry as a whole. With projections estimating monthly revenues of over $20 per room per month, and at approximately 100 rooms per property, Cable's opportunity equates to approximately $120 million *per month*, not including potential revenue for bundled high-speed data and telephony services!.[8]

While off-air broadcast HD channels are allowed to be transmitted in "clear QAM" over the cable system and hotel networks, all cable programmers, from ESPN to HBO, require protection of their HD (and sometimes SD) content all the way to the

at a glance

48,062	properties*
4,476,191	guestrooms
$139.4	billion in sales
$65.52	revenue per available room (RevPAR)
63.1%	average occupancy rate

*Based on properties with 15 or more rooms.

Source: American Hotel & Lodging Association

guest room television. To accommodate programmer terms of service, cable operators are required to *secure* delivery of HD video throughout their network and that of their commercial customers. Secure means digitally encrypted. And unlike the residential market where conditional access decryption is performed by stand alone devices connected to the television, usually a set-top box (STB) or CableCard™, hospitality demands less conspicuous and tamper-proof security methods.

Key to selling into the hospitality market is the ability to deliver secure, manageable HD content to each room without the use of a set-top box (STB). This is both for aesthetic reasons as well as potential tampering / theft of STBs in high-traffic hospitality environments. While STBs or CableCard-equipped televisions may work in residential, neither approach has been embraced by the hotel industry, requiring alternative security implementations at the hospitality premise. While daunting, this barrier to entry is quickly fading thanks to the CE industry's adoption of two unique conditional access systems, LG's Pro:Idiom™[9] and tru2way®[10], into commercial HDTV sets.

---

[6] American Hotel & Lodging Association, *2008 Lodging Industry Profile*
[7] American Hospital Association, *Fast Facts on US Hospitals*, April 2009
[8] LodgeNet Interactive Corp, *2008 Annual Report*, March 13, 2009
[9] Pro:Idiom is a trademark of Zenith Electronics, a subsidiary of LG Electronics, Inc.
[10] tru2way® is a trademark of Cable Television Laboratories, Inc.

The Hotel Standard - Pro:Idiom Encryption

Currently the defacto standard for the hospitality industry, the Pro:Idiom encryption system enables secure distribution of digital video content in hotels, hospitals, and other commercial environments. Pro:Idiom was developed by LG Electronics in conjunction with major hotel chains, and has been licensed to several other well-known consumer electronics manufacturers, including Philips, Panasonic, Zenith and Sharp.

Pro:Idiom was designed to be integrated into commercial HDTVs without requiring a set-top box[11]. While some commercial-grade televisions have Pro:Idiom circuitry built-in, others require a separate card to be installed in the television. Pro:Idiom uses an AES (Advanced Encryption Standard) 128-bit key encryption algorithm, which is on-par with current cable set-top box encryption systems.

Pro:Idiom Card installs in rear of commercial LG television

Video service providers seeking to service Pro:Idiom-protected systems are required to obtain a license from LG's Zenith subsidiary. In addition to entering into a license agreement, MSOs must pay LG a one-time license fee covering use by all individual systems. Note, however, that Pro:Idiom television purchasers (hotel, hospital, etc.) are *not* required to have a Pro:Idiom license. Licensing is only required for the manufacture and operation of Pro:Idiom encryption systems.

Initially made available to the hospitality sector in 2005, Pro:Idiom's reach has since expanded to include most commercial HDTVs deployed across large- and mid-sized hotel properties today. Though deeply entrenched in hospitality, Pro:Idiom is still an open encryption standard which opens the door to cable operators hoping to compete for new free-to-guest HD programming contracts.

Pro:Idiom Implementations

To service Pro:Idiom-equipped hospitality properties, cable operators are required to decrypt their digital signals from set-top compatible, industry-standard PowerKey™ or DigiCypher™ formats and re-encrypt into Pro:Idiom for delivery within the hotel. Where the necessary equipment is deployed to manage this encryption, either on the hotel premise or at a centralized location along the operator network, is wholly dependent on the unique design and bandwidth demands of the cable system.

---

[11] Note that for some Lodgenet VOD solutions, a 'set-back' box is required for two-way communication.
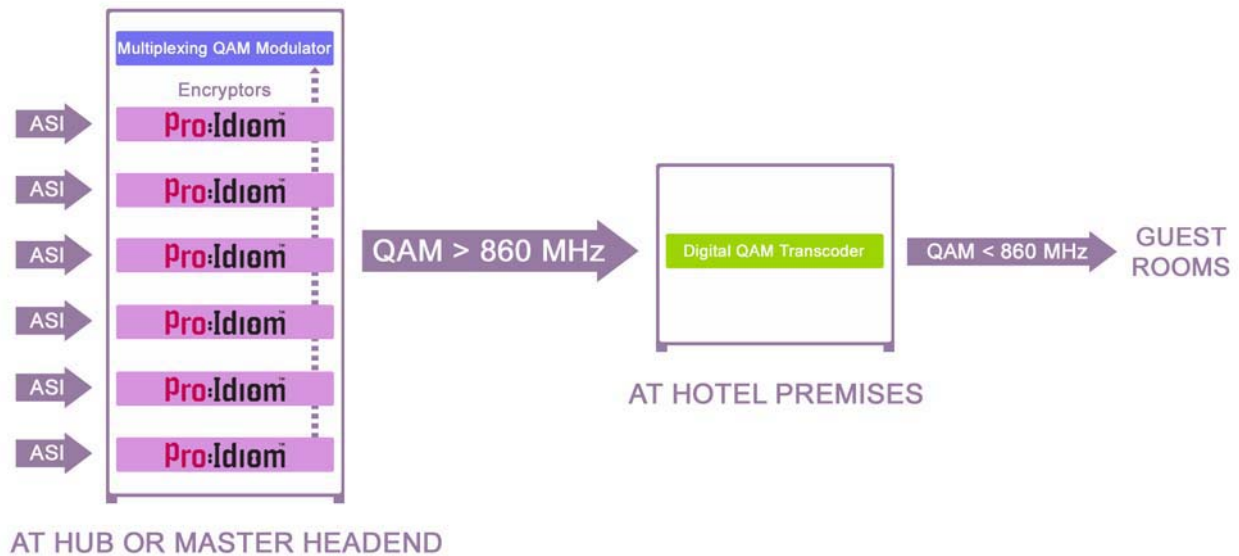
Centralized Encryption Scenario

Figure 1 – Pro:Idiom Centralized Encryption Scenario

By encrypting at a central location, such as an operator hub or master headend, the operator may have an opportunity to save some cost by sharing the encrypted digital stream across more than one hotel / hospital. Additionally, a centralized architecture eliminates the need to decrypt digital streams at each customer location prior to Pro:Idiom encryption since streams at headends are typically available unencrypted.

The downside to this approach, however, is that precious bandwidth is needed to transmit the Pro:Idiom encrypted signal to the receiving locations. This is typically done by either a separate cable or fiber run from the headend / hub to the customer facility, or by modulating the Pro:Idiom QAMs between 860MHz and 1GHz (usually unused or under-used spectrum because most STBs and HDTVs cannot tune that high). This latter solution requires that the coaxial plant extending from the headend to each hospitality property support up to 1GHz downstream, and the operator to convert the 860+MHz QAMs back to a sub-860MHz frequency on-premises.

Summary of the Centralized Encryption Scenario
- HD and SD streams are Pro:Idiom encrypted at Headend or Hub
- Stream multiplexing and QAM modulation
- Transport to Hotel via Fiber and / or Coax
- Frequency shift (demodulation / remodulation) at hotel premises

PROS: Pro:Idiom Encryption shared among multiple locations; Local decrypt not necessary

CONS: Need bandwidth for Pro:Idiom streams on HFC, or separate run to Hotel Premises

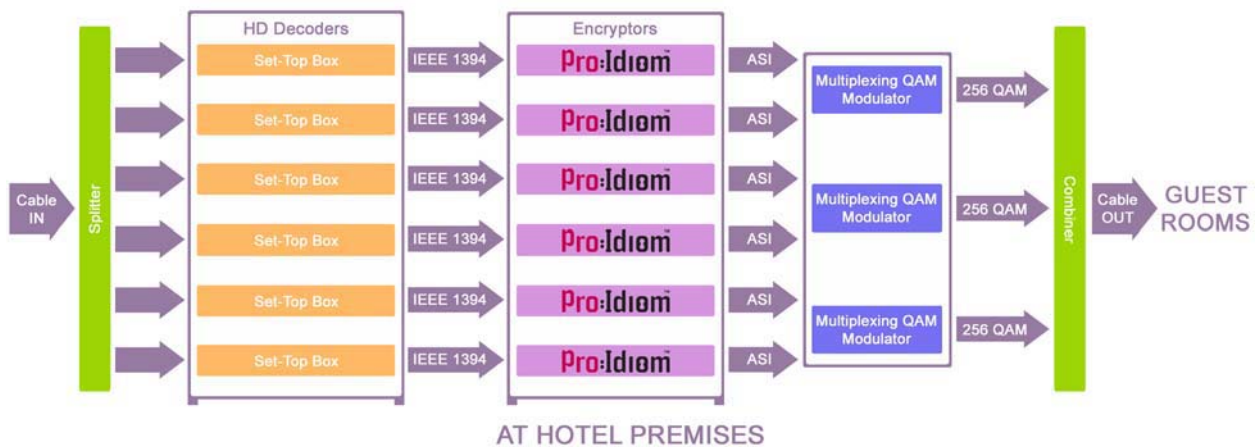*On-Premises Encryption Scenario:*

Figure 2 – Pro:Idiom On-Premises Encryption Scenario

In many cases, some or all of the channels in a hospitality application require on-site encryption. This is often because of bandwidth constraints, wherein the cable operator does not have the extra bandwidth over their 'residential' HFC network to carry Pro:Idiom-encrypted channels on top of the same content encrypted for their STBs. In this scenario, digital video channels are received off of the primary residential HFC feed at the hospitality premise, decrypted by HD STBs, and re-encrypted in Pro:Idiom.

Summary of the On-Premises Encryption Scenario

- Cable CA decryption through conventional STBs
- HD and SD streams are Pro:Idiom encrypted at Hotel Premises
- Stream multiplexing / QAM modulation using cost-effective Edge QAMs
- Approximately 30 channels per 6 foot secure rack are feasible

PROS: Use 'Residential' HFC feed; Customize lineup per property

CONS: More equipment (including STBs) per location; HD channels supplied to hotels may not be switched

Pro:Idiom's Case for Cable

Leveraging the Pro:Idiom security solution enables cable operators to align their content distribution networks with the most widely deployed conditional access system in the hospitality sector. As *the* defacto hotel encryption standard, Pro:Idiom provides the shortest time-to-market for cable-delivered HD video, but requires continued operator investment in equipment and on-premise support[12]. Pro:Idiom provides remote management capabilities within the hotel network – an improvement over legacy stand alone devices – though currently doesn't support switched digital functionality.

---

[12] It should be noted that when cable Free-to-Guest is combined with a third-party VOD system, aligning the incoming channels with the on-site generated channels in the hotel's coaxial spectrum can be a significant issue.

The New CableCard Alternative

The tru2way middleware platform, developed by CableLabs® in conjunction with leading MSO partners, enables digital video devices to freely connect and interact with cable distribution networks minus a set-top box. Formerly referred to as the OpenCable™ Application Platform (OCAP™), the tru2way system leverages both software and hardware (CableCard) components to secure the flow of content from a cable operator network to tru2way-enabled CE devices (TVs, DVRs, etc.) while allowing overlay of third party developer applications for customizable, interactive services.

CableLabs requires CE manufacturers seeking to integrate tru2way interactivity into their product designs to participate in certification testing for each device employing the technology. Additionally, manufacturers are required to enter into an ongoing licensing agreement and over the course of development and certification, pay license, certificate, account and testing fees ranging from approximately $40K to upwards of $100K.

Currently, tru2way technology is in the early stages of deployment as CE manufacturers and MSOs seek to align equipment launch schedules with network compatibility across markets. Initial implementations of the technology are geared solely to the consumer market, however, operators recognize significant advantages await them in commercial services environments.

In a tru2way-enabled hospitality model, the shortest path between point A, the MSO, and point B, a hotel customer, is theoretically as close to a straight line as Cable is going to get. tru2way promises a secure, direct path for programming content to travel from the operator headend to the guest room television, without requiring a decrypt / re-encrypt at the hotel to enable distribution within the premises. This should result in minimal onsite hardware and maintenance costs for the operator when compared to alternative solutions. If the hospitality property has a third-party VOD/PPV system, there exists some potential for a demodulation/remodulation hardware requirement in order to manage potential conflict in QAM channels residing at the same frequency between the cable plant and within the hotel's network.
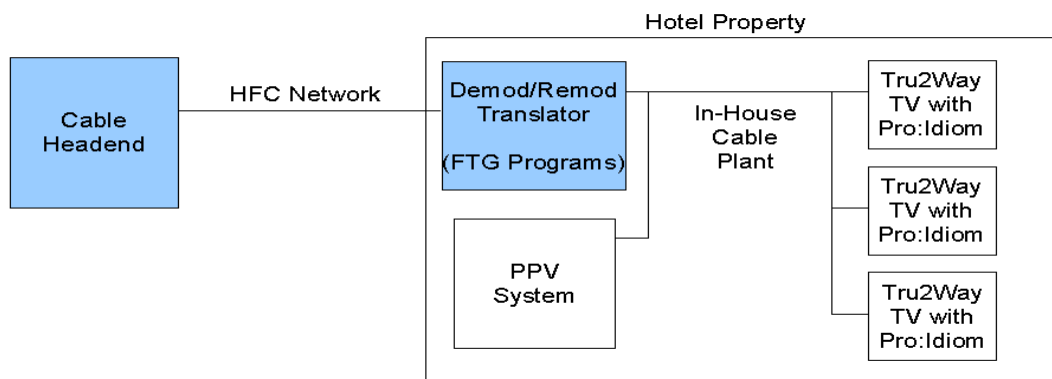

Figure 3 – tru2way Hospitality Network

Selling tru2way into Hospitality

Developed as a proprietary standard for the cable industry, tru2way may prove to be a double-edged sword for operators depending on which market they're selling into. On the residential side, consumers currently seeking to ditch their set-top box and take advantage of enhanced interactivity by purchasing tru2way-enabled devices are heavily invested in their cable provider from this point on. The same is true of commercial services customers, once a determination is made on when commercial grade, tru2way-enabled HDTVs will become available. However, Cable will be challenged with getting in front of these customers ahead of their sizable HD infrastructure investment, and making a compelling case that establishes tru2way as the more attractive, long-term alternative.

Commercial tru2way TVs may lack compatibility across alternative conditional access environments, making them a potentially risky, all-in proposition for commercial property owners seeking to make a one-time outlay toward HDTVs. However tru2way's ability to deploy unique and interchangeable applications over its interface can be leveraged to incentivize customer investment, and once installed, offer opportunity for the operator to up sell additional interactive, on-demand or backend management services.

The Switched Digital Advantage of tru2way

MSOs deploying switched digital technology across their systems will appreciate tru2way's support of these bandwidth reclamation efforts in the commercial, hospitality deployments. The direct tru2way link to the cable headend allows the MSO to monitor channel requests from hotel TVs, so if no one is in a guest room and the TV is turned off, the tru2way module will release that channel from network requirements.

Tailoring Second-Generation HD Hospitality Solutions to Cable

Given the importance of commercial customers to cable MSOs, leading technology vendors are actively developing future solutions which will offer a greater degree of integration and density, while lowering the per-SD and per-HD channel costs. Expected to be available in the next one-to-two years, these solutions bring a number of advances to Cable's HD hospitality world, including:

- Input Flexibility:
    - the ability to receive MSO content by either QAM (directly from the 'residential' HFC plant) or IP (GigE) via fiber from the cable headend to the hospitality property
    - the ability to encode / insert local video channels such as hotel or hospital barker channels, local tourism videos, etc.
- Optional decryption modules for proprietary encryption systems (via CableCards or similar security devices) without requiring a discrete set-top box per channel

- Optional encryption modules to encrypt data in the conditional access system required by the hospitality network owner (such as Pro:Idiom)
- Hospitality property-specific Guide Channel Rendering
- Remote access via Internet for configuration / monitoring
- Guest television configuration / control - commercial televisions can be configured for various parameters, such as limiting maximum volume (so neighbors are not disturbed), channel mapping, etc.
- Video On Demand delivered by MSO VOD system
- Switched Digital Video support option
    - With tru2way TVs, this means a simple pass-through of communications data
    - With Pro:Idiom TVs, emulation of the Tuning Adapter functionality is required, as well as two-way communications path between the guest TV and the hospitality headend
- Redundancy / Backup (modules, power supplies, etc.)
- Module hot swap – guest services are uninterrupted even during servicing
- Scalable to accommodate the ever-growing number of HD channels
- Optional high-speed-data support, enabling commercial-level internet service for hospitality customers
- Optional voice (cable telephony / VoIP) support, enabling commercial-level voice service for hospitality customers
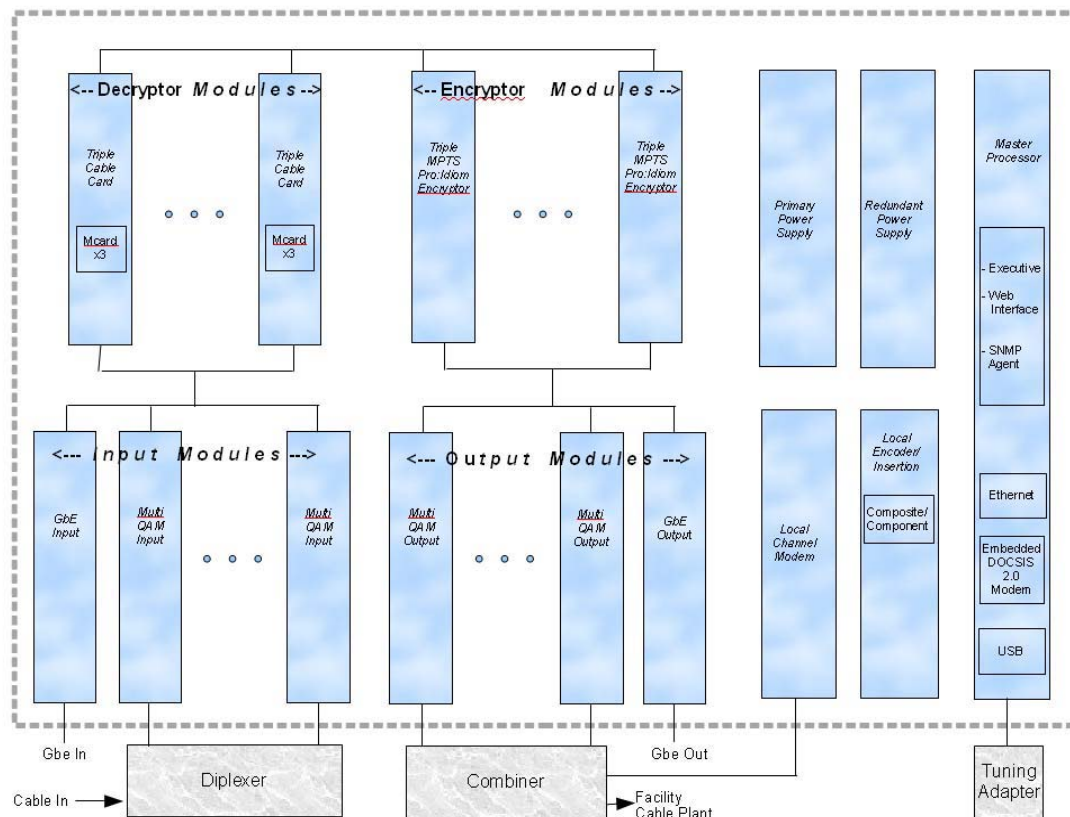

Figure 4 - Second Generation HD Hospitality System

These next-gen hospitality platforms will act as an intelligent bridge between the MSO's network and the hotel or hospital's network, efficiently transcoding data in both directions. In many ways, this platform will have similarities with residential network interface devices which bridge an MSO's network to a single-family residence network for video, voice and data services.

Check-In Time: The MSO Opportunity

It's time for Cable to make a reservation and check back in to the hospitality market. The adoption of HDTV Free-To-Guest services within hotels, health care and other commercial customers presents an immediate opportunity for cable operators to regain the hospitality market share they once enjoyed. Additionally, it better positions Cable to sell bundled high-speed-data and voice to the same customers.

Cable should understand which cost-effective solutions exist today for bringing cable's HD content to hotels, hospitals, and other commercial premises. Pro:Idiom and tru2way conditional access systems both need to be supported for Cable to maximize its opportunity within the entire spectrum of hospitality properties (large-, mid-, and small-sized). Also, MSOs should forge alliances with major hospitality chains, with the major manufacturers of commercial HDTVs, and with interactive hospitality system providers such as LodgeNet or Hospitality Network.

Finally, Cable must recognize that this opportunity is fleeting – hotels are adding flat screen HDTVs rapidly, and Cable's satellite and telco competitors are actively selling into this market touting their own HD options for hospitality owners to consider. An aggressive MSO strategy will leverage both Pro:Idiom and tru2way platforms to maximize their market opportunity. Each hospitality property transitions to digital / HD only once. By getting out ahead of the curve, MSOs can proactively market their HD-based commercial video, data and voice services bundle.■

APPENDIX A: List of Abbreviations and Acronyms

QAM	**Quadrature Amplitude Modulation** is the method of modulation used by most cable system operators when transmitting digital video, voice, and data content over their cable networks.
"Clear" QAM	Denotes digital video content which is not encrypted. This is commonly used to refer to digital video channels which can be directly received and viewed by an HDTV set without requiring a digital set-top box or other mechanism to first decrypt the data. Most often, these are SD versions of basic cable channels (i.e. CNN, The Weather Channel), or SD or HD versions of a major broadcast network (i.e. ABC, CBS)
SD	**Standard Definition** is the digital version of a television channel which approximates the resolution conveyed by analog transmission of that channel.
HD	**High Definition** is the digital version of a television channel which is substantially higher than the resolution conveyed by analog transmission of that channel. Often more specifically referred to as 720p or 1080p resolution as defined by the Advanced Television Systems Committee specification.
Free-to-Guest	The television services which are delivered to a hospitality industry guest as part of their base room rate (i.e. at no extra charge).
STB	**Set-Top Box** is a device provided by cable or satellite provider to enable viewing of protected content. In today's environment, the STB typically is required to decrypt HD and some SD channels.
AES	**Advanced Encryption Standard** is an encryption standard adopted by the U.S. government and is used to protect digital data ranging from financial transactions to HD video content.
MSO	**Multiple System Operator** typically refers to a large cable operator who owns and operates cable systems in a large number of communities. The largest MSOs today include Comcast, Time Warner, Cox, among others.
PowerKey™	The primary conditional access system used by cable operators who deploy digital STBs from Cisco Systems, Inc.
DigiCypher™	The primary conditional access system used by cable operators who deploy digital STBs from Motorola, Inc.
Pro:Idiom™	The primary conditional access system used by hospitality systems who utilize commercial televisions from LG Elecronics, Sharp, and / or Philips.

APPENDIX B: Annotated Bibliography of Key Resources

American Hospital Association, *Fast Facts on US Hospitals*, April 13, 2009.
http://www.aha.org/aha/resource-center/Statistics-and-Studies/fast_facts_2009.pdf

American Hotel & Lodging Association, *2008 Lodging Industry Profile*
http://www.ahla.com/content.aspx?id=23744

Communications Technology, *Cable and Hotels: Why and How to Serve this Market*, by Glen Hardin, Time Warner Cable, April 1, 2008
http://www.cable360.net/ct/strategy/businesscases/28872.html

LodgeNet Interactive Corp, *Consumer Needs Market Assessment*, August 10, 2007.

LodgeNet Interactive Corp, *2008 Annual Report*, March 13, 2009.
http://biz.yahoo.com/e/090313/lnet10-k.html

LodgeNet Interactive Corp, *First Quarter 2009 Form 10-Q*, 8-May-2009.
http://biz.yahoo.com/e/090508/lnet10-q.html

LodgeNet Interactive Corp, *Noble Financial Fifth Annual Emerging Growth Equity Conference*, June 8, 2009
http://www.lodgenet.com/AboutUs/InvestorCenter/Company%20Presentations/Noble%20Financial%20PPT%20Final%206.08.09.pdf