

Blu-ray technology comes up to speed

The true cost of winning the format war

The disc equipment manufacturers were at the front line of the high-def disc war, having to invest in both formats, as Debbie Galante Block explains, but once that battle was over, the war of keeping ahead of the market started.

Most companies had development going on for both HD-DVD and Blu ray before the format was decided upon but, admittedly, it was a difficult time.

Companies had to invest a great deal in order to be prepared for either a choice, or for the decision that both formats stand.

How did equipment and software manufacturers get to where they are now? Singulus Technologies was prepared for both formats. With Spacelife HD-DVD, they had 2006 and 2007 systems in the market. In October 2005, the company had also delivered the first Blu-ray production systems.

"HD-DVD was a good format based on the DVD, but Singulus Technologies always preferred Blu-ray," says Sylvia Hitzel, Vice President, Marketing and Sales. With multi-layer and hybrid discs, there is a large variety of choices for the media industry. Currently, 150 BluLine systems have been installed internationally, she says.

Testronic was also prepared for both formats but, as Josh Erkman, Vice President, Global Operations for Film and Television Services, explains, performing QC on both Blu-ray and HD-DVD was challenging. "As we discovered audio or video issues on one format, we needed to cross check the issues on the other. That period exponentially increased the time we spent on QC in comparison to DVD. We had to test both HD formats against each other, presenting us with even longer QC times."

Audiodev took development a step at a time. According to Peter Falk, CEO, their initial challenge was that they were basically starting from square one. The CATS Blu-ray tester was designed from the beginning for testing Blu-ray Disc. "We designed our reference drive

platform together with the German company Toplica Photonics in parallel with designing the measurement platform. Initially, we focused only on Blu-ray Disc, after which both the reference drive and the measurement hardware/software was modified to handle HD-DVD."

Erkman was initially quite surprised when Blu-ray won the format war. "From what we had seen up to that point in QC, HD-DVD indicated a more stable format, an easier implementation for authoring and replication companies coming from DVD, and other advantages. However, the main drawback to HD-DVD was 20 GB less storage capacity than Blu-ray for a single-sided dual-layer disc."

Over the years, Blu-ray has capitalized on its increased storage capacity and advanced programming flexibility by bringing forth highly interactive features. Titles are available today that have a highly immersive consumer experience that would not have been possible in HD-DVD, he says.

The quibbling over the preferred format slowed down adoption even after Blu-ray became the chosen one, sources say. Falk's one complaint is that companies working with the testing and manufacturing of the discs could have been involved at an earlier stage when the formats were being developed.

"One thing that the format developers did right was that the formats as such were very much 'complete', especially



Audiodev's testers were originally designed for Blu-ray Disc

the BD format. The format is very flexible, yet well defined, which is important when one is aiming for a high market compatibility."

BluFocus CEO Paulette Pantoja says the company was formed before the format war ended, but was always 100% dedicated to Blu-ray. "The challenges we faced were the many compatibility issues encountered with different devices all based on interpretations of the Blu-ray specification. It was a learning experience for all. How people authored discs and built players evolved with every disc created."

Primeria's Technology Europe's Katrin Hoffman says one challenge for the company in the beginning was to find the perfect burn drives for its Blu-ray Disc Publishers. In the early days, there weren't that many choices, "but as we always want to offer our customers high-quality products we had to make sure that the quality of the drives met our expectations and quality standards. Same applied to the Blu-ray media

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Primerica could recommend its customers." After the format war ended there are more brands to choose from and the acceptance of Blu-ray has become broader.

In terms of developing the plastic resin for the high definition discs, Jack O'Malley, Director, Sales and Marketing, Performance Resins Division, Bayer Material Science LLC, comments, "We had to make sure that Makrolon [polycarbonate] was fully functional in either Blu-ray or HD-DVD. The challenge was not meeting each individual format requirement, but being certain that our global product Makrolon OD-2015 met

The Blu-ray Disc Association (BDA) has and continues to play a big part in developing the Blu-ray format. Erkman says that through BDA's 'round robin tests' and compliance programs, they have worked on bridging the gap between the content developers/providers and the CE manufacturers. While there have been challenges, there is certainly collaboration and a viable platform for the sharing of ideas.

As a result, consumption of Blu-ray movie discs significantly rose by 27% last year, according to Hitzel. Futuresource, she says, is even forecasting an



Bob Edmonds of Eclipse Data Technologies

Peterson, Director of Marketing, Rimage Corporation. A lot of strength exists in the business to business use of CDs, DVDs and Blu-ray Discs to archive and distribute information. "Our sales are strong. Our systems are used to print more than 150 million discs per year. The market is strong and profitable."

Peterson admits that the format war between HD-DVD and Blu-ray probably slowed growth by a year, but Blu-ray is growing. "In archiving, for example, people are looking for a green business model. While archiving info on a hard drive requires electricity, Blu-ray discs can sit on a shelf for years. They won't use any power and data won't get lost."

Primerica's Hoffman offers an example as to how reliable optical discs continue to be. Hurricane Katrina destroyed or severely damaged all medical records at the Louisiana Veterans Health Care System (formerly VA Medical Center, New Orleans).

"Of the data on the optical disc, 98% could be recovered, while data stored on HDD and tape was dead after a month in the high temperature, humidity, mud and dirty water. The medical centre had just started to migrate patient images and files to UDO (Ultra Density Optical) for an archive solution when the hurricane hit. They are now primarily using UDO archives for its long-term recoverability."

Hoffman says Blu-ray's viability goes even further. "Our Blu-ray Disc Publishers are mostly used where large volumes of data need to be confidently stored and/or in mission-critical applications such as law enforcement, government, banks and financial institutions and others who need the highest reliability in their disc burning and printing."

Björn Christophersen of Advanced Digital Research (ADR) says his company is looking to the future with more on-demand production. The market is "not so well developed in Europe like in the US and still in its infancy. We hope that this will change in the near future."

The company recently launched an automatic Blu-ray Publisher, the Diskmaker with up to 33 drives and three thermal printers allowing publishers to produce very large volumes. With this machine options like Watermarking and DRM are offered which are also available with the company's smaller machines. "We are hoping to see some of the larger European publishers hop on board and switch to on-demand publishing for some of their older titles."

ROOM FOR IMPROVEMENT?

Blu-ray continues to develop. "One challenge that still remains in the BD replication process is how to archive



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all format requirements. Continuous process and product improvements led to Makrolon OD-2015 approval in all active disc formats." Bayer was an approved supplier for both Blu-ray and HD-DVD formats.

DEVELOPMENT HIGH POINTS

Collaboration is what made developing Blu-ray systems all the more exciting for Testronic, Erkman explains. "We worked] with our studio clients and their content developers to create the QC approach for the Blu-ray format's first highly interactive, multi-user BD-Live application."

The process involved a dedicated Testronic team, comprised of a number of highly skilled staff, working over the course of hundreds of man hours over many weeks. The Testronic team drafted the QC test script, and performed the necessary QC as each application was deployed to the various testing, staging, and production servers. "Utilizing the company's video game and software QC expertise on a project for their Film and Television Services division was also an important step in the evolution of our company, as we are now seeing much convergence in all of these areas."

Audiodev's Falk says one high point in the format development for the company occurred early last year, when it moved all development and manufacturing of its reference drives for 2x BD and 4x DVD to Sweden, which meant that every single piece of the drive is now handled and checked by Audiodev.

additional increase by 35% for 2012.

Also, the single layer Blu-ray Disc for games is a growing product. "We think that optical discs will keep their position worldwide for a long time."

CEO Michael Hosp at Kdg mediatech agrees with Hitzel: "As to all those predictions regarding the death of the disc, we prefer to say there's plenty of life in the old dog yet. The biggest amount of money earned in the business is still generated from the sale of packaged media."

Chip Viering, President of Optical Media Manufacturing, comments, from their perspective, that the studios still derive 60% plus of their revenue from physical media, and it may be a very long time before they can make up the difference in digital. "It's not very easy to build a brand on the internet and even tougher to create brand loyalty in cyber space. Plus, there are 35,000 DVD kiosks in the US and growing. That's a lot vending machines to fill, meaning the DVD/Blu-ray player will be in the house for a very long time, and that's good."

Use of physical discs, streaming and downloading are likely to be intermingled. Initiatives like UltraViolet and Walmart's Disc-to-Digital are aimed at keeping discs alive. However, there is more to the story. Not all people are tech-savvy. "There are people out there who live their lives electronically and have a lot figured out. But there are still huge lines outside the Redbox kiosks in my community on Friday and Saturday nights!" Viering notes.

Decline in music disc sales is really where the perception that discs are dying comes from, according to Tom



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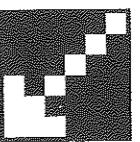
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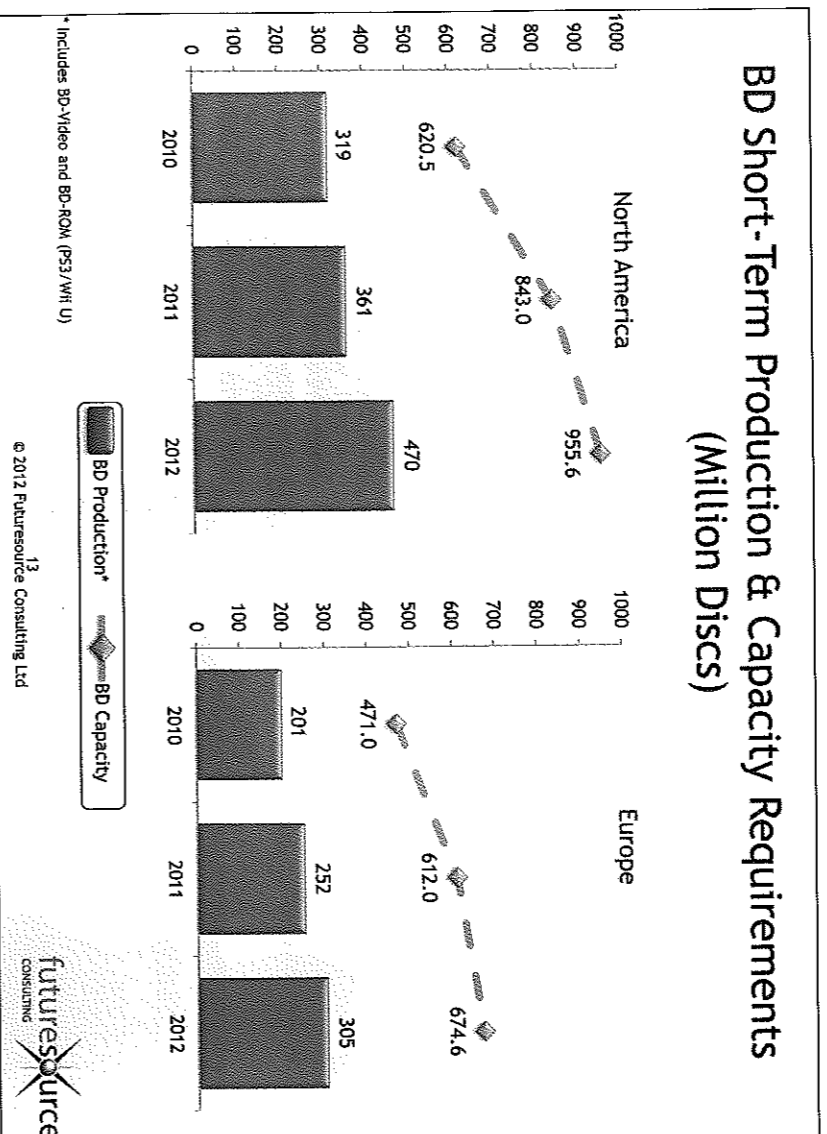
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ROOM FOR IMPROVEMENT?

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BD Short-Term Production & Capacity Requirements (Million Discs)



customer masters," says Bob Edmonds, Vice President, Sales and Marketing, Eclipse Data Technologies. "The sheer size and number of titles that need to be archived makes the process difficult and often expensive. Eclipse has recently developed a unique solution to address this problem with a simple cost effective method in a product called ImageArchive."

In terms of mastering, the BD glass mastering process is fairly stable, according to Edmonds, but premastering is another story. "Our customers are always faced with new errors that disrupt their process of receiving master images for replication. It is a constant challenge to offer new versions of software to help keep their processes running smoothly."

Beyond manufacturing, Blu-ray faces another important obstacle. Consumer awareness is still an area where Blu-ray can improve, and it is necessary for it to be embraced as a highly workable technology, says Testronic's Erkman. "There are some areas of the Blu-ray format that have resulted in consumer confusion and consequently have had an adverse effect on consumer adoption. Those include different player profiles, BD-Live, 3D, and most importantly player firmware updates."

John Fitzgerald, CEO of replicator EDC, believes that the slower adoption of Blu-ray has come from that confused consumer as well as from the early adopters. Consumers paying attention to the format war were hesitant to buy Blu-ray and on the other hand, some early adopters of the technology were disappointed.

"This lives on with consumers – once bitten, twice shy – something I am sure we will continue to see in the CE market." On the positive side, EDC has only recently begun manufacturing Blu-ray, but Fitzgerald says they are seeing "passion for the product" from their customers.

One way to gain consumer acceptance and create that passion is to push the format's boundaries and offer the most exciting and immersive experience possible in the home, believes Erkman, who is, "Not sure that is always happening. Blu-ray is not just a movie disc, as many consumers may be perceiving. Many content providers are utilizing the storage capacity of Blu-ray for more audio and subtitle streams rather than using the room for interactive creative content. The real capabilities of Blu-ray should not be overlooked, even though interactive content can be more expensive to create."

Other issues associated with Blu-ray development and acceptance exist. For example, the workflow and all the royalty issues are a problem, according to Hosp. "Having so many companies claiming licence fees per disc forces replicators to sign up at far too high fees.

Unfortunately the inventors and owners of the format did not sort out all these issues so they were unable to offer us a fair, transparent and workable solution. Bear in mind, Blu-ray was launched in 2006, but they only rolled out their royalty program in 2011. In the meantime, current market prices do not allow us to cover all these fees."

Copy protection is also still a bone of contention. "It is disappointing that the



Peter Falk of Audiodev

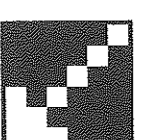
CONCLUSION

While Blu-ray may not have been the most "convenient" format for manufacturers, ending the format war early on "gave us a clear idea of the way forward", says Kdg's Hosp. "We know it will never replace DVD totally, but serve instead as an additional revenue stream for our clients. What matters is to offer end-consumers multiple options for content use, so initiatives like Disc-to-Digital or UltraViolet are definitely a good move in the right direction."

Discs, all sources say, are here to stay for a long while. D2D



Josh Erkman of Testronic Labs



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