

## The future's bright for Blu-ray!

The objective of this white paper is to look at Blu-ray recording, duplication, storage and playback and discuss:

- **What is available today?**
- **Who is typically using Blu-ray and what are they using it for?**
- **What is happening with the competing HD-DVD format?**
- **Where is Blu-ray heading in the future?**

### What is available today and what is Blu-ray capable of?

Blu-ray recorders for use in PC's first became available back in 2006. Since then consumer Blu-ray players for the home have been launched as well as Sony's Playstation 3 console which features a Blu-ray player as standard. So, to help us answer this question, here are some [FAQs about Blu-ray](#):

### Why the name Blu-ray?

The technology employs the use of a blue wavelength laser to read and write to the disc. Mis-spelling it from 'Blue' to 'Blu' allows it be adopted as a distinctive trademark. Blu-ray as a format is backed by over 175 member companies who are part of the Blu-ray Disc Association. Key members include Sony, Pioneer, HP, Dell, Philips Electronics, Hitachi, Walt Disney, TDK, 20th Century Fox, Warner Brothers and Apple.

### How much can I store on a Blu-ray disc?

At present there are two types of capacity of disc available - single layer and dual layer. A standard single layer Blu-ray disc can hold 25GB of data or 135 minutes of high definition film and 2 hours of bonus features in standard definition quality.

A dual layer Blu-ray disc can hold 50GB of data or 3 hours of high definition film and 9 hours of bonus features in standard definition quality. The most popular recordable disc to date is the single layer 25GB version. As well as being available in a branded format discs are now also available with a printable surface for use with Blu-ray duplication and print systems.

### How does Blu-ray storage compare to CD and DVD?

A standard single layer Blu-ray disc holds the equivalent content of 36 CDs or 5.75 DVDs.

### Are Blu-ray disc available in recordable and re-writable formats like CD and DVD?

Similar to both CD & DVD; Blu-ray disc are available as a once only recordable disc (BD-R), as a re-writable disc (BD-RE) and in a pre-recorded pressed disc format (BD-ROM).

### How much time does it take to write a BD-R and BD-RE disc?

Recording speeds of 1st generation recorders were 2x speed and it takes around 46 minutes to write a full disc of 25GB. Recently 4x speed drives from manufacturers such as Pioneer have become available which reduce this down to 22 minutes.

### Are Blu-ray recorders backward compatible with CD and DVD discs?

All drives are able to play CD and DVD content. All drives except the earliest ones are capable of CD and DVD recording. Some very early drives will only record DVD.

**Are Blu-ray duplication systems available?**

Yes, Blu-ray duplication and print systems are now available, both at an entry level as well as high end print and production systems. For more technical information and details please refer to our website. [www.cdteam.co.uk](http://www.cdteam.co.uk)

**What kind of PC will I need to run my Blu-ray recorder?**

If you want to record data then any PC that already supports 16x DVD recording will support 4x Blu-ray recording. If you want to play retail Blu-ray titles you will need an HDCP compatible graphics card and display. Finally if you want to author, record and playback high definition (HD) video using a Blu-ray recorder you will need a high specification PC and graphics card.

**What recording software will I need?**

To record data you can use a programme such as Roxio Digital Media LE version 7 which is bundled with some of the Blu-ray recorders now available. Equally you may find that you are able to upgrade your current recording software once Blu-ray support had been added.

**Once you have recorded information to a Blu-ray disc how long will it last?**

Main manufacturers such as TDK and Sony claim information recorded to Blu-ray discs will remain readable for 30 - 50 years. This area is always difficult to reliably calculate as accelerated ageing tests and their assumptions can be viewed as controversial. Having said that, the Blu-ray disc Association members include some of the biggest names in the computer and entertainment industry all with vested interest to ensure this format stands the test of time.

**I've heard something about needing an HDMI connection. What's that?**

Put simply, less spaghetti like cables in your business or home. HDMI (High-Definition Multimedia Interface) is essentially a system that allows you to connect all your home devices such as games consoles, High definition TV, Blu-ray player, audio, home theatre systems and set top boxes all together using fewer cables.

**Will Blu-ray films be region encoded?**

Yes. In order to help film publishers regulate the sale and release of their film titles throughout the World, BD Regional Playback Control divide countries into three geographical areas.

Region Code	Geographical Region
A	North America, Central America, South America, Japan, Korea, Southeast Asia
B	Europe (EU), Africa, Middle East, New Zealand, Australia
C	China, India, Russia, Rest of the World

A Blu-ray pressed film contains a checking programme that automatically compares it's own details to those encoded in the player and will stop if both do not match.

### **Who typically is using Blu-ray and what are they using it for?**

Whilst there is a massive amount of interest in Blu-ray, the main users of it at present seem to originate from two areas; film & broadcast and the games industry. Both of these vertical markets typically work on very data hungry content from both visual and audio sources. These type of companies were amongst the first early adopters of both CD and DVD technology, so it is not a surprise, especially as the lines between games and film have become more blurred that they are the first to embrace the advantages that Blu-ray has to offer.

**Film & Broadcast** - High definition film and television broadcasting offers unrivalled picture quality and the increase in the sale of HD televisions demonstrates the consumer's desire to move onto the next generation and see this improved visual experience. Many broadcast companies such as the BBC already have film projects created for HD transmission and these are being filmed using systems such as Sony's XDCAM camcorders which are being seen as one replacement for the traditional tape loaded broadcast cameras. These use Blu-ray disc manufactured by companies such as Sony and TDK.

High definition satellite broadcasting is already a reality in most parts of the developed World and is becoming the standard that consumers will expect to see on their televisions at home. High definition images will always tend to mean higher Gigabyte capacity. With the high capacity that Blu-ray offers, users today are able to record, view and store high definition images using a Blu-ray recorder in their PC or watch a Blu-ray film on their set top Blu-ray player in the home. DVD does not have sufficient capacity to handle these storage needs.

Blu-ray recorders for use in a PC are already available from a number of manufacturers such as Pioneer, LG, Plextor and Sony. Blu-ray players for home use are in the shops now from companies such as Sony, Panasonic, Samsung, Pioneer and Sharp.

Major film studios such as Warner Brothers, Sony Pictures and 20th Century Fox are releasing mainstream titles onto Blu-ray as well as their usual release onto DVD and this is set to grow.

**Games companies** - The worldwide launch of Playstation 3 with its integrated Blu-ray player has undoubtedly helped kick start Blu-ray. Games developers themselves have been users of Blu-ray recorders, discs and duplicators as part of their internal pre-release development of games titles. In the first 6 months Sony have so far shipped 1.3 million Playstation 3 consoles in Europe alone. The release schedules for new games on this console from both Sony and third party developers will continue to increase penetration and awareness of Blu-ray-quality entertainment .

**Other Blu-ray users** - Early adopters apart from the above two are again with businesses who have 'data hungry' applications. This typically covers archiving, imaging and the mapping sectors or anyone that needs high resolution images needing instant access or retrieval. Recent adopters have included Police forces and central government departments. As computers, software and applications get faster and need more transferable storage, expect to see Blu-ray soon become a necessary ingredient and standard in the general business market.

### **What is happening with the competing HD-DVD format?**

Whilst there are fewer companies in the HD-DVD Promotion Group there are still some significant ones none the less. These included NEC, Toshiba, Sanyo and Thomson. HD-DVD discs have a similar capacity to single layer Blu-ray discs and are less expensive to manufacture. However, due to the differences in their structure Blu-ray disc technology is seen to have more longevity as a format. The reason for this is that the recording layer is closer to the surface than an HD-DVD disc. This allows the future development of multi layer versions of the Blu-ray disc which will see capacity grow up to 200GB. (See 'Where is Blu-ray heading' below for more details).

The HD-DVD camp was also given an initial boost with support from the porn industry as Walt Disney, a founder member of the Blu-ray Association objected to Sony's replication arm manufacturing adult titles. This appears to have been resolved as Blu-ray manufacturing is now being licensed to other mass replicators worldwide as the market grows in much the same way as CD and DVD have. Adult film makers in Japan have already begun to adopt Blu-ray as their choice format to replace DVD.

HD-DVD drives were launched at a lower price than their Blu-ray counterparts but lack of content in comparison to Blu-ray is beginning to take its toll. Sales of Blu-ray content exceeded those of HD-DVD titles by a factor of 2 to 1 in the USA in the first half of 2007 and the video chain Blockbuster have recently announced their decision to stock over 1500 Blu-ray titles throughout all their USA stores. So, whilst HD-DVD started well, the amount of content available, industry support, future longevity, economic pricing and depth of hardware products available is making Blu-ray emerge as the clear favourite.

### **Where is Blu-ray heading in the future?**

Take up has been slow to date for mainstream adoption mainly due to initial costs which again was similar when both CD and DVD were introduced and recorders for a PC could cost anything from £1,500 to £10,000. Current costs of a Blu-ray recorder are below the £500 mark and are set to drop further as manufacturing volumes ramp up. Blu-ray players for the home have recently reduced to around £500, much closer to the HD-DVD price. With offers from a number of competing manufacturers this will ensure that pricing will follow a similar downward path.

Another important affect on the take up of Blu-ray will be the driven by the number of PC's that start to ship with Blu-ray ROM players or recorders rather than DVD-ROM/recorders. Until recently this has been minimal with some PC manufacturers only offering it with their high end systems and others waiting to see which of the two formats starts to dominate before including an option in their range. Over the coming 12 months as both home and business consumers begin to buy Blu-ray enabled PC's most people believe this will ensure acceptance for Blu-ray as the next generation solution.

### **So, what effect will a format war have on growth?**

As with any new technology introduction, the thought of any kind of format war does make people think twice before committing. The announcement and launch by LG of their hybrid, Blu-ray/ HD-DVD recorder and drive will allay some of those fears and as the market seems to be growing steadily in favour of Blu-ray then any fears of making the wrong decision should begin to diminish in the eyes of most consumers.

Current disc capacities for Blu-ray with a single layer are 25GB and 50GB with a dual layer. This is already considerable for most users needs. A number of manufacturers such as TDK and Sony have already announced they have prototype Blu-ray discs capable of storing 100GB and even up to 200GB with the use of multiple layer and double side usage. As such, most experts and manufacturers see this as a format with many years of life ahead of it.

Even beyond this there still seems to be a strong future for some kind of optical disc in the home and business arena. Microholographic and holographic technologies can push capacity up to 500GB and even 1 Terabyte (TB, 1,000GB) on a standard DVD size disc.

For more general information about the future growth of optical disc technology please ask for a free copy of our white paper titled, '[A positive future for the optical disc](#)'.