

# Making the transition . . .

*DVD >>>> Blu-ray >>>> 4K Blu-ray*

## What is 4K UHD?

4K, also referred to as UHD (Ultra High Definition) is the latest advancement in the delivery of cinema on physical media; i.e. DVD & Blu-ray discs and now also digitally via streaming services.

Today Smart TVs are common-place and provide a high definition 4K picture for free-to-air and streaming programs that are available for viewing at home.

A 4K disc renders film images at a resolution of 8 million pixels which is very close to the resolution we enjoy in commercial cinemas.



## The Evolution of DVDs . . .

The DVD format supports a natural video resolution of 720 x 480 (480i). When you put a disc into a DVD player, the player reads this resolution.

**Hence, DVD is classified as a standard resolution format.**

This worked well when the DVD format debuted in 1997, but DVD player manufacturers soon decided to improve DVD image quality. They implemented additional processing to the DVD signal after it was read off the disc but before it reached the TV. This process is called **progressive scan**.

**Progressive scan DVD players output the same resolution but provide a smoother-looking image.**

## Introduction of DVD Upscaling . . .

When HDTV came along, image quality needed more help. In response, DVD makers created a process called upscaling.

**Upscaling mathematically matches the pixel count of the DVD output signal to the HDTV physical pixel count . . .**

. . . which is typically 1280 x 720 (720p), 1920 x 1080 (1080i or 1080p), or 3840 x 2160 (2160p or 4K).

So for example, if you play a 1080p DVD in a 1080p DVD player to 4K TV or 4K projector the image will be upscaled to 4k; this is generally a good thing, although some discs may show flaws at this resolution.

**720p** represents 1,280 pixels displayed across the screen horizontally and 720 pixels down the screen vertically. This means there are 720 horizontal lines on the screen displayed progressively, or each line displayed following another.

**1080i** represents 1,920 pixels displayed across a screen horizontally and 1,080 pixels down a screen vertically.

This means there are 1,080 horizontal lines displayed alternately; odd lines are displayed, followed by the even lines.

**1080p** represents 1,080 horizontal lines displayed sequentially. This means all lines are displayed during the same pass.

**4K (or 2160p)** represents 3,480 horizontal lines displayed sequentially so all lines are displayed during the same pass.

## And then came Blu-ray . . .

The Blu-ray format was released in June 2006. It was designed to supersede the DVD format, capable of storing several hours of high definition video.

**'Blu-ray' refers to the blue laser, in reality a violet laser, used to read the disc, which allows information to be stored at a greater density than is possible with the longer wavelength red laser used for DVDs.**

This greater density allows for much more detail to be encoded onto the disc; so sharper, richer, more detailed images and sounds are stored on the Blu-ray disc.

**The 4K Ultra HD Blu-ray format** arrived in 2016 and delivered high dynamic range content that significantly expanded the range between the brightest and darkest elements, expanded colour range, high frame rate (up to 60fps) and up to 3840x2160 pixel resolution.

## DVD Upscaling vs. Blu-ray

An upscaled DVD, even when it's good, can't match the quality of a natural Blu-ray disc source.

Compared to a Blu-ray disc, an upscaled DVD tends to look flatter and softer, especially in the background.

There's a difference when looking at reds and blues. With upscaled DVDs, reds and blues tend to override underlying detail. The same colours in Blu-ray are tight, with the detail visible under the colour.

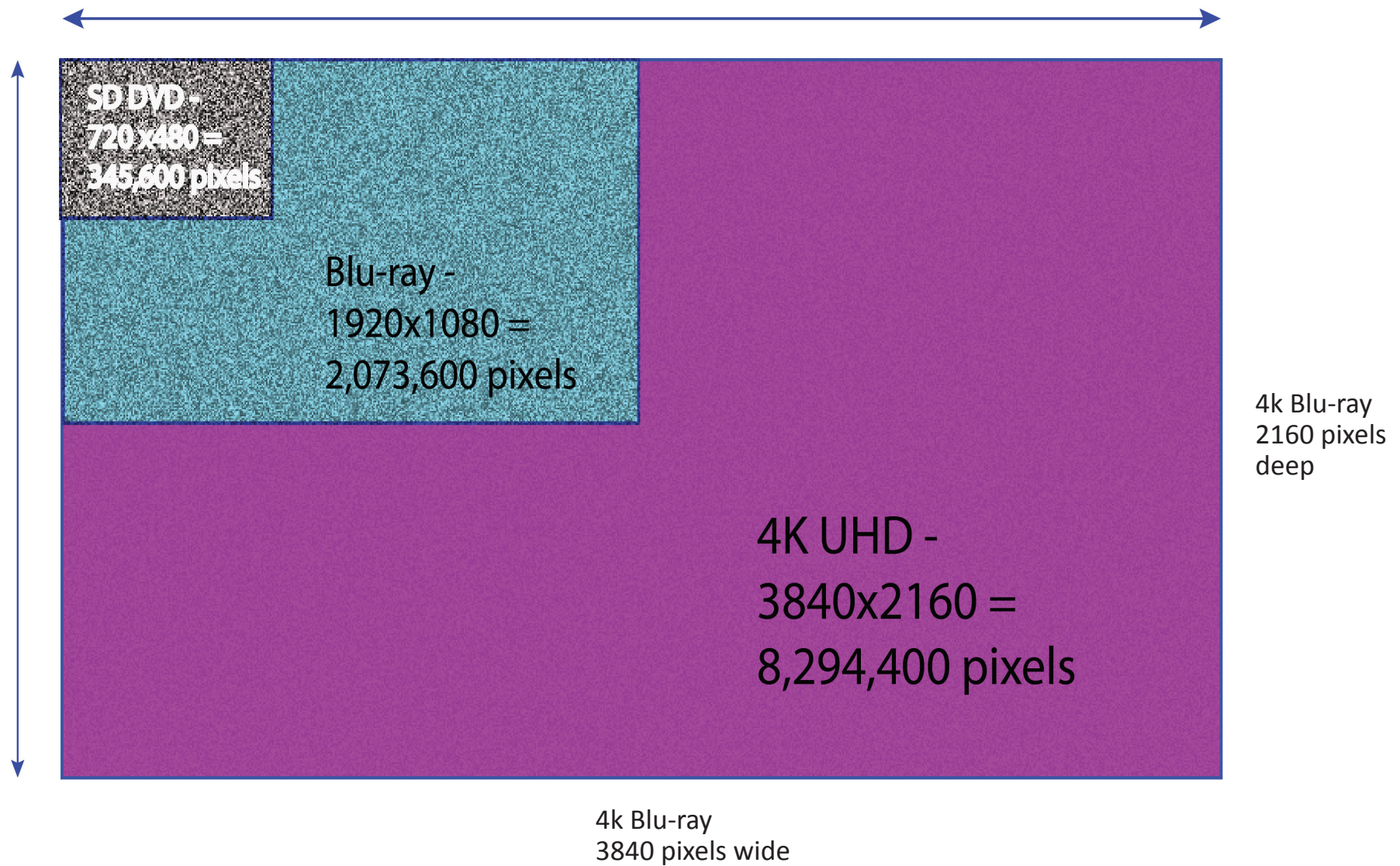
Although an upscaling DVD player can only upscale DVD to 1080p, an Ultra HD TV can accept that signal and upscale it further to 4K.

### **Blu-ray makes DVD content better**

All Blu-ray disc players can upscale standard DVDs, provided the player is connected to an HDTV or 4K Ultra HD TV . . . **using the HDMI connection option.**

Some Blu-ray disc players have built-in 4K upscaling for both DVD and Blu-ray disc playback. If a Blu-ray disc player doesn't provide this feature, the 4K Ultra HD TV further upscales the 1080p signal from the Blu-ray disc player to 4K.

# Pixel density for 16:9 image aspect



## Why should we consider 4K technology for Film Societies?

Apart from a visit to a commercial cinema where we experience the best viewing and listening conditions, most of us can now enjoy high quality film viewing at home on our 4K capable smart television sets.

Since the demise of 35mm film projection all commercial cinemas screen in 4K digital using the DCI (Digital Cinema Initiative) format which is actually 4096x2160, just slightly larger than 4K on Blu-ray.

Streaming services such as Netflix etc. offer films in 4K, and free-to-air high definition channels deliver great quality UHD 4K for sport and other live programming.

It's worth pointing out that streaming 4K is not as good quality as seen on 4K Blu-ray discs due to the amount of compression streaming services use to manage bandwidth use and to ensure smooth delivery.

As 4K distribution becomes the norm, Film Societies may be impacted by members enjoying high quality cinema at home via 4K deliveries contrasting with older DVD projections which will deliver lower quality sound and picture.

Many movies are now available in 4K resolution, for both recent releases and older 'classics', delivering much higher picture and sound quality for all films.

Even a standard definition DVD can look and sound better played on 4K equipment.

One of the best (and most dramatic) improvements 4K delivers is the remastering and re-release of older classic/ iconic films onto 4K.

Prior to circa 2000, feature films were shot on film (35mm or 16mm) not digital. So original negatives or first positives can be scanned and re-mastered without any loss of quality and any scratches, blemishes or colour issues can be corrected.

Soundtracks can be enhanced and improved too during this process.

Obviously the end result of all of this work depends on the source material available to work with.

## What do you need to go 4K?

- A 4K (native 4K) Blu-ray player (ideally a region-free model but not essential).
- A 4K (native 4K) projector - NOT an 'upscaling' type.
- A couple of 4K UHD capable HDMI cables.

## What does it cost?

- A native 4K Blu-ray player costs between \$250 and \$800 approx.\*\*

*As long as you get a native 4K player from a reputable brand the more expensive models are more aimed at those who want to record films for future use and aren't necessary for usual film society purposes*

- A native 4K Projector costs from approx. \$2000 up to \$20,000+\*\*

*From my research I believe that the sweet spot price-wise for a projector is the \$4000 - \$6000 mark. More expensive models have additional features which, while useful, aren't essential, and of course your budget limitations are a consideration too.*

- 2 x High quality 4K UHD compatible HDMI 2 cables costs around \$50 each\*\*

*4K UHD capable HDMI cables are necessary to ensure all the enhanced features of 4K movies are able to be processed by the projector and the sound system.*

*\*\*Price indications are as at February 2023.*

*Prices, availability and models change frequently.*

## The steps Macedon Ranges FS took to go 4K.

- Researched 4K equipment over several months.
- Estimated what the cost would be based on a likely equipment requirement; (model changes, availability and pricing vary a lot so be prepared).
- We sought and received funding from local government and our local bank (Bendigo Community Bank Gisborne) on the basis that we are a not-for-profit, volunteer-run community group.
- Decided on which equipment to purchase. We opted for mid to upper-end priced gear.
- Ordered and took delivery of new 4K Blu-ray player and 4K Projector and HDMI 2.2 cables to connect.
- Connected the player to the projector and our sound system amplifier, both via HDMI cables.

## Things to know and to consider . . .

### The Player –

- **4K players are backwards compatible** i.e. will play Standard and HD DVD, Blu-ray and 4K Blu-ray discs.
- Brands that we consider worthy of consideration include Panasonic, Sony and LG.  
We purchased a Panasonic 4K player and high quality HDMI 2.2 cable to connect the player and projector.
- Our Panasonic player is region-free and was purchased on-line from USA.  
It is modified and sold by a third party manufacturer and carries full factory warranty. The cost – AU\$800 approx. delivered from the US.
- If you aren't concerned about access to region-locked discs then purchase a locally available player which will play everything else and cost around \$300-\$400

### Region-free Players –

- **4K Blu-ray movies are currently region-free** and likely to remain so.  
However if you have Blu-ray and DVD movies that are region locked then you will need a region-free 4K player.
- At present region-free 4K players are only available from overseas – specifically USA and UK
- **Aim to purchase Blu-ray equipment that is NATIVE 4K in resolution.**  
Some equipment is marketed as 4K which it achieves via upscaling - this is NOT true 4K and NOT the best solution.

## More things to know and to consider . . .

### The Projector -

Numerous brands out there and prices have come down significantly in recent years.

Choose a '**native resolution**' **4K Projector** i.e. full 4K 3840 x 2160 resolution – some projectors are sold as 4K but are HD projectors that use upscaling to produce a 4K type image which, whilst good, is inferior to native 4K.

We chose a **JVC LX NZ3 native 4K projector** using a laser light source.

The laser light is a bit brighter than the traditional bulb used, but more importantly the life of the laser light source can be significantly longer than a bulb at around 20,000+ hours and, unlike filament bulbs, its light source does not degrade (i.e. lose brightness) over time.

### Short throw projectors –

There are now native 4K short throw projectors available – simply they project the image from a very short distance from below the screen which could be very handy depending on the size, shape and layout of your venue.

### Your sound system -

Depending on the sound system you use, check that it will accept an HDMI \*input connection; if not there may be adaptors or other connector options that can be used.

*\*In our case the amplifier has HDMI inputs so we had a straight forward connection.*



For the technical minded . . . .

## 4K Re-release – Rear Window 1954

Dir: Alfred Hitchcock

Starring: James Stewart, Grace Kelly, Wendell Corey, Thelma Ritter

Technical Details -

Runtime: 112 minutes

Sound Mix: Mono (Western Electric Recording)

Colour Info: Colour

Aspect Ratio: 1.37 : 1 (original ratio) / 1.66 : 1 (Intended & theatrical ratio)

Camera: Mitchell BNC, Bausch & Lomb Baltar Lenses

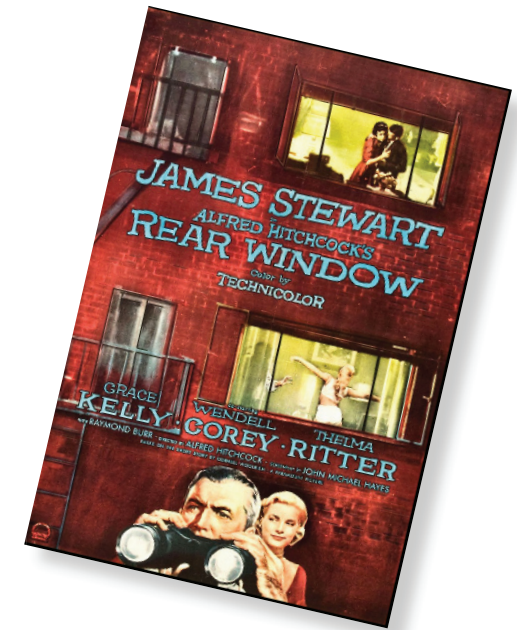
Laboratory: Technicolor, Hollywood (CA), USA (colour)

Film Length: (12 reels)

Negative Format: 35 mm (Eastman 25T 5248)

Process: Digital Intermediate (4K) (2020 remaster)

Printed Format: 70 mm (blow-up) / 35 mm



## Summary . . .

- ▶ **4K upgrades your movie watching experience**
- ▶ **4K can ‘future proof’ your Society**
- ▶ **4K will play everything\* - DVD, Blu-ray and 4K Blu-ray**
- ▶ **4K can greatly improve the picture and sound of existing DVD and Blu-ray discs**
- ▶ **4K means your Society can compete quality-wise on equal terms with Cinemas, Streaming Services and Smart TVs in the home.**
- ▶ **Classic and iconic movies re-mastered and re-released on 4K Blu-ray deliver a whole new and sometimes unique way to enjoy these movies.**

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