

# Federation of Victorian Film Societies Inc

## INFORMATION SHEET 29 Version 03



### KEEPING UP WITH TECHNOLOGY 4K (UHD) For Film Societies

4K digital screen resolution is gradually increasing its presence in the world of cinema viewing.

- 4K Televisions are now mainstream (home viewing is enhanced).
- 4K movies are increasingly available as new/current releases and increasingly there are re-releases of older and classic movies remastered to 4K – all on Blu-ray.
- 4K or UHD (Ultra-High-Definition) as it is often called, offers a 400% increase in image resolution offering vastly enhanced image and sound quality.

This increasing availability of 4K technology raises a question for film societies: As more people now own large 4K smart TVs (virtually all TVs on the market now are 4K) with superior image and sound quality, and they watch more films at home via streaming services, does your film society provide the best possible picture and sound quality (at least equal to home viewing)?

#### What is 4K? - also known as Ultra High Definition, Ultra-UHD or UHD.



A typical HD (High Definition) movie on a DVD or a standard Blu-Ray disc is delivered at a resolution of 1920 pixels wide x 1080 pixels deep. (A pixel is one picture element).

A 4K movie can only be delivered on 4K Blu-Ray disc at a resolution of 3840 pixels wide x 2160 pixels deep (aspect ratio 16:9) **which is 4 times the resolution** of a standard HD Blu-ray disc. Not surprisingly this means vastly better quality images and sound.

The cinema projection industry uses the 'Real 4K' or DCI (Digital Cinema Initiative) standard, which is slightly higher than Blu-ray 4K, at 4096 x 2160 resolution.

Some 4K movies are now available on streaming services, although research indicates that they use heavy compression technology which diminishes the end result somewhat, and there's also the variable broadband (NBN) service to impact on quality. So 4K on a Blu-ray disc is the best possible quality delivery.

#### Why would a film society move to 4K?

Setting aside the important social, communal and shared experience benefits of a film society, viewing a film is about enjoyment, and an important part of that is image and sound quality – 4K will ensure that.

As more films are released in 4K there will be growing pressure to access them via the right equipment.

Currently most 4K releases are new/current movies from the big 'Hollywood' end of the industry along with remastered re-releases of classics and older blockbusters. As an example JB Hi-Fi have nearly 700 4K titles available on their web-site already. Admittedly not a lot in the way of independent, arthouse and foreign language material is available in 4K at present but this should change as 4K's penetration spreads.

4K re-mastered 'Classic' movies include many Hitchcock favourites, epics like Lawrence of Arabia, Mr Smith Goes To Washington, Dr. Strangelove, Gandhi, A League of Their Own, and so on. A Google search will show what's available.

Prior to about 2000 most movies did not contain CGI (Computer Generated Images) and other digital effects which are created in 2K – these are not suitable for upscaling to 4K. However the older movies shot on 35mm or 70mm film can be upscaled to 4K with excellent results.

Moving to 4K means societies can ensure members have the best possible viewing experience, comparable with, or better than the home viewing experience provided via streaming services – this is important to keep societies relevant in a changing world.

#### Moving to 4K

Your society will need a 4K Blu-ray Player and a 4K projector, which are more expensive than older HD gear but not dramatically more, and the discs are marginally more expensive.

#### Region Coding

As of right now, 4K Blu-ray movie titles are not region coded. With a 4K Blu-ray Player, you should be able to play a 4K Blu-ray disc from anywhere in the world.

But, it's also important to know that standard resolution Blu-ray and DVD discs retain their region-coding when played on a 4K Blu-ray machine, so you will not be able to play foreign Blu-ray or DVD discs on a 4K Player unless it's a region-free model.

Therefore, if your society sources region coded films on standard Blu-ray and DVDs from overseas, a

region free or unlocked player is needed. Alternatively, you could retain your region-free Blu-ray or DVD player for those few foreign discs you want to play. If the player has an HDMI output you should be able to connect it to your 4K projector, and still achieve a good image and sound.

**Important notes of caution:**

- 1. There are Blu-ray players currently on the market featuring '4K Upscaling'. These are not true 4K players. They are standard Blu-ray players with the ability to upscale an HD image to '4K' but with less than true 4K quality. These players will not play 4K Blu-ray discs!***
- 2. Not all movies you might want to screen are available in 4K or even Blu-ray, Do your research before committing to the new technology. Check with your sources for the availability of 4K and Blu-ray discs. But remember, if and when you upgrade to 4K projection you will still be able to play your DVDs and Blu-ray discs - and get a better result. It will look better on 4K equipment.***

**If your society is considering upgrades, 4K equipment should be at the top of the list.**

**The Cost.**

4K Ultra-HD Blu-ray player – range \$200 - \$800 approx

4K Ultra-HD projector – range \$2,000 - \$6,000 approx.

You will need improved HDMI cables - \$50 each, approx.

4K Ultra HD Blu-ray discs (if available) are approximately twice the price of DVDs.

Here are a couple of specialist retailer web sites which may assist when shopping for 4K equipment - **[www.bigpicturepeople.com.au](http://www.bigpicturepeople.com.au) and [www.justprojectors.com.au](http://www.justprojectors.com.au)**

**The Future.**

Streaming access of 4K will become easier and better when 5G mobile technology is widespread. 5G is mooted to upstage NBN for download speeds with 5G starting at 100mbps heading up to 1Gbps whereas NBN generally tops out at 100mbps.

*A note of caution with 4K streaming – This uses a lot of bandwidth on the broadband system and so streaming providers use compression to make it possible to deliver the data efficiently.*

*Depending on the amount of compression, the quality of the 4K image/sound may be impacted.*

*In other words streaming of 4K won't deliver true 4K quality – it may be quite acceptable but it's not true 4K.*

If you plan to screen only 4K Blu-ray discs you will not need a region-free player, as all 4K discs are region free.

If you wish to screen a DVD or Blu-ray disc which is not an Australian region (Region 4 or B respectively), an alternative option is to use a region-free Blu-ray player connected to the 4K projector. It will not be a 4K image, but it will be at least as good as the original Blu-ray. This will avoid your having to make an overseas purchase of the region-free 4K player, with its extra cost and warranty issues.

If you have a 5.1 Dolby sound system already, check its interconnection cable requirements. A 4K Blu-ray player is likely to have HDMI outputs for video and audio, so double check what is needed before you commit.

All prices quoted in this document are indicative as at March 2023.

The following pages contain a copy of the Powerpoint presentation on 4K by Henry Screen at the FVFS Information Day / AGM in March 2023.

# 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.

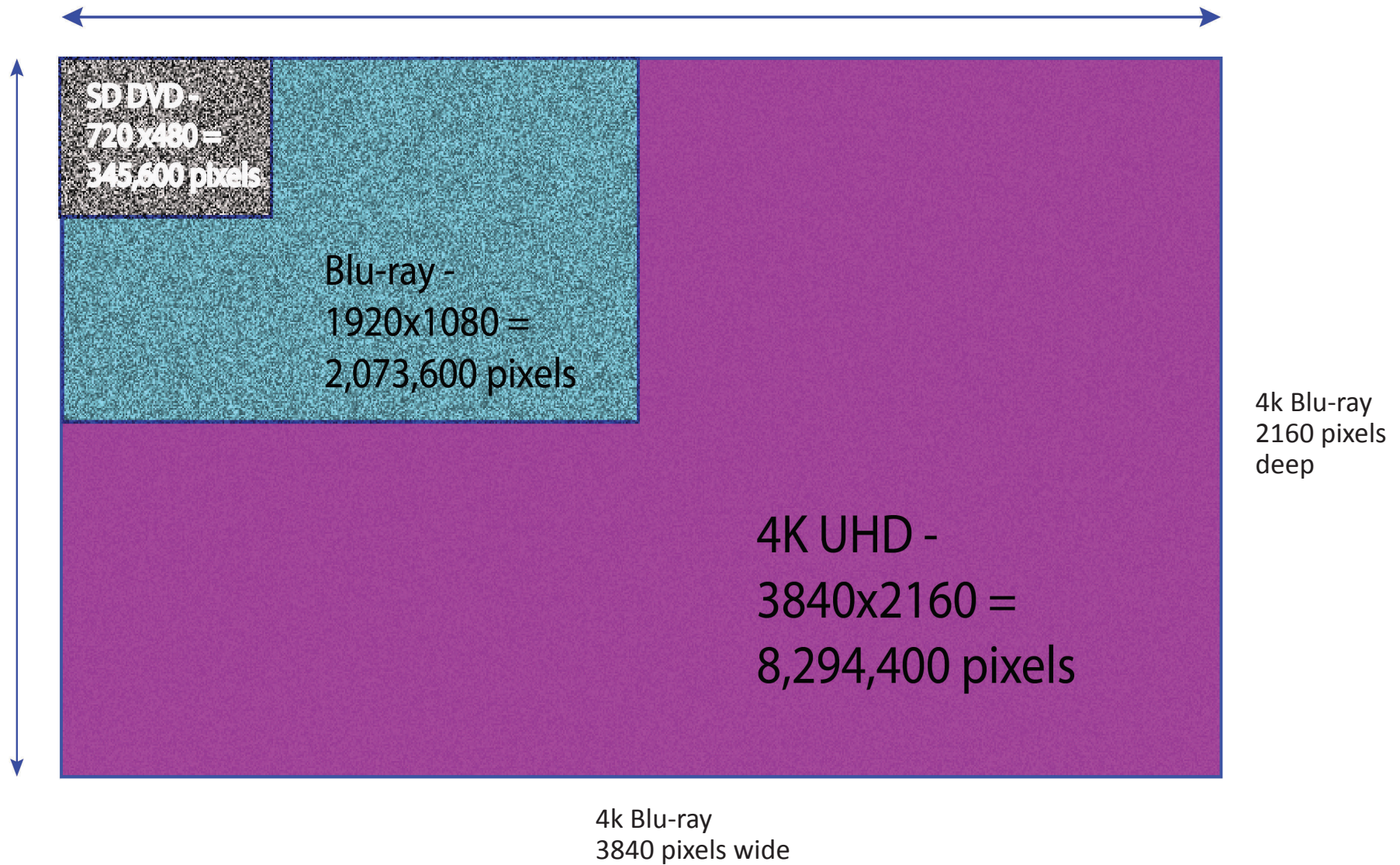
Although an upscaling DVD player can only upscale DVD to 1080p, an Ultra HD TV can accept that signal and upscale it further to 4K.

### **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.**

*\*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.*