

# **RECORD 4K VIDEO WITH A SMART PHONE OR TABLET**

A Learn in 30 Presentation

For PATACS + OPCUG

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# FHD and 4K resolutions defined

- Full High Definition (FHD) resolution is 1920 pixels Horizontal and 1080 pixels Vertical .
- 4K doubles both the horizontal size and the vertical size of each frame
- 3840 x 2160 resolution, about 8.3 megapixels per frame
- Why is greater resolution useful? Human eyes love detail.
- **4K shows a lot more detail than FHD.**

# Agenda

- 4K HDTV sets
- 4K video streaming services and Blu Ray discs
- 4K video cameras
- 4K video recording apps for Android and iOS devices
- A free 4K video editor
- How to display 4K video on an LG 4K smart TV

# Today's standard is FHD

- FHD, Full High Definition, has a resolution of about 2.1 megapixels per frame, specifically 1920 pixels wide x 1080 tall, and 30 frames per second (fps).
- Many small, inexpensive HDTVs provide FHD resolution or 1280 x 720 resolution.
- HDTVs are computers running Linux. HDTVs also support other frame rates (15, 25, and 60 fps for instance).
- The digital transmission standard was adopted to replace the decades-old analog TV standard.

# Why 4K is useful and important

- 4K is already in widespread use
- 4K TVs and 4K Blu Ray players are inexpensive already
- Your grandchildren will grow up with 4K video and learn to expect it
- You can make videos of your grandchildren and yourself inexpensively today, using your smart phone or tablet
- You can edit 4K video using free video editor software
- You can show your 4K videos on a 4K TV

# 4K digital movies

- The first 4K digital movie I saw in a movie theatre was the **Star Trek Into Darkness movie**, May 2013.
- I relearned a lesson that night: a screen can be **too wide**.
- Spread 3840 pixels across a 20-foot-wide screen, and you can see every pixel (198 per horizontal foot on a 20 ft wide screen).

# 4K Digital HDTVs

- 4K HDTVs became available in the US in 2012 with a price tag of \$20,000.
- In ten years, the price has dropped. A lot.
- 4K HDTVs are often advertised Ultra HD (UHD), with greater contrast to reveal more distinct colors.
- All 4K HDTVs are sold with HDMI input sockets for Blu Ray players, Roku and so forth, USB sockets, and often WiFi and Ethernet for connection to your LAN.

# 4K Digital HDTVs

- I bought a 42 inch LG HDTV at the end of 2017 for \$300.
- That HDTV screen measures just over 36 inches horizontal, about 100 pixels per inch, or 1200+ per foot.
- **4K video looks great on that HDTV!**
- Even high resolution digital photos look good on that 4K HDTV! It is the world's highest resolution digital photo frame.



# The Chicken or the Egg

- There has long been a belief that any new media player won't sell until media is available to play.
- 4K Blu Ray players are widely available now for as little as \$100. Those players cost more than a 4K HDTV in 2017.
- Redbox rents 4K Blu Ray titles, and sells *used* 4K titles.
- Amazon sells 4K Blu Ray titles.
- The CD Cellar retail store in Falls Church sells used 4K titles.

# The Chicken or the Streaming Egg

- The Roku Premiere 4K streaming box was released in 2016.
- I bought it when I bought the LG 4K HDTV.
- Roku recently released its Roku Ultra 4K streaming box.
- Amazon Prime Video offers 4K movies to stream.
- Netflix also offers 4K movies to stream.
- If you want to watch 4K streaming video, then find a reliable high-speed Internet service.

# FHD video cameras

- FHD camcorders have become the low-cost high quality devices for US consumers, with zoom lenses.
- Some models of major brands sell for as little as \$200.
- All record on flash memory cards, mostly SD cards.
- Most smart phones and tablet Camera apps record FHD video.
- Some digital SLRs also record FHD video.
- The most widely used digital video file format is MP4.

# 4K Camcorders

- When buying a 4K camcorder, you get what you pay for.
- Amazon is awash in sub-\$100 4K camcorders from brands even I have never heard of, with no zoom lenses.
- The major camcorder brands offer 4K Camcorders with zoom lenses, costing \$1000+.
- Some **used** major brand 4K camcorders might be available.
- In general, that gap between \$100 and \$1000 persists.

# Phones, Tablets and 4K

- This Wikipedia page provides a long list of 4K compatible phones.
- [https://en.wikipedia.org/wiki/List\\_of\\_4K\\_video\\_recording\\_devices](https://en.wikipedia.org/wiki/List_of_4K_video_recording_devices)
- Compatibility is not defined on that page.
- Compatibility includes a camera sensor with at least likely 4K resolution, and CPU speed, RAM speed, and storage speed.
- Not every camera on a multi-camera device will be compatible.



# Phone camera resolution examples

| Phone             | Camera       |                          | Camera          |                          | Camera    |                          | Camera    |                          |
|-------------------|--------------|--------------------------|-----------------|--------------------------|-----------|--------------------------|-----------|--------------------------|
| Galaxy S10 (2019) | Front selfie | 3968 x 2736<br><b>OK</b> | Rear ultra-wide | 4806 x 3456<br><b>OK</b> | Rear wide | 4032 x 3024<br><b>OK</b> | Rear Tele | 4032 x 2268<br><b>OK</b> |
| Galaxy S7 (2016)  | Front selfie | <b>X</b>                 | Rear            | 4032 x 3024<br><b>OK</b> | none      |                          | none      |                          |
| iPhone X (2017)   | Front selfie | 3088 x 2320<br><b>X</b>  | Rear 1x         | 4032 x 3024<br><b>OK</b> | Rear 2x   | 4032 x 3024<br><b>OK</b> | Rear Wide | 4032 x 3024<br><b>OK</b> |

Minimal camera resolution compatible with 4K is **3840 x 2160**.

**OK** = resolution equals or exceeds 4K

**X** = not enough resolution for 4K

# How to record 4K video with your iPhone

- iPhone 6S and more recent iPhones have a pointnshoot 4K recording capability ***built into the Camera app***.
- To select 4K video recording resolution and frame rate, use the iOS 15 **Settings** app:  
**Settings → Camera → Record Video → Select the desired 4K resolution and frame rate**
- Video file type is **MOV** (Quicktime)

# The iPhone X Camera app 4K video recording screen





# How to record 4K video with your iPhone

- Various apps have provided several improvements on the Camera app video recording capability.
- One I like: **ProMovie**
- Provides controls like a digital SLR in Manual exposure mode.
- This app record 4K video in MOV files.



# The ProMovie Screen



# How to record 4K video with your compatible Android phone

- You need a 4K video recording app.
- App requirements: no ads or minimal, high ratings, stores video on SD card, some exposure and focus control; preferably using all compatible cameras.

# How to record 4K video with your compatible Android phone

- Here's what I found on February 9, 2022:
- In the Play Store: **HD Camera for Android**
- On my Galaxy S10 phone, its icon is named **Camera**.
- The app does *not* record 4K video by default, but can be configured to do so.
- Uses only one S10 rear camera.
- Records videos in MP4 files.



# The HD Camera for Android screen for 4K video recording



# OpenCamera app for Android

- This free app includes exposure control during recording
- Tested on June 17, 2022
- On my Galaxy S10, its name is **Open Camera**, now also named that in the Play Store
- Uses only one S10 rear camera
- Records video in MP4 files



# Open Camera app Video screen



# **Windows Video Editor applications and 4K video MP4s**

- Moving Picture Experts Group (MPEG) version 4 (MP4) is the lossy file format used for recording Android 4K video and FHD video.



# Video file size comparison

| file size per second | Camera app and file type             |
|----------------------|--------------------------------------|
| 6.0 MB avg           | 4K Camera HD AKA Open Camera MP4     |
| 5.12 MB avg          | HD Camera for Android AKA Camera MP4 |
| 6.15 MB              | iPhone X Camera app MOV              |
| 3.9 MB               | ProMovie for iOS MOV                 |

MP4 and MOV, both lossy file formats, support variation of the degree of loss. A file of any given duration and frame rate can be either gigantic, with minimal loss of detail, or much smaller, with much greater loss of detail.

None of these apps allow you to control or change the degree of loss. It is clear that some use greater loss config to make files smaller, and some use a more minimal loss config resulting in greater file size per second.

# Windows Video Editor applications and 4K video MP4s

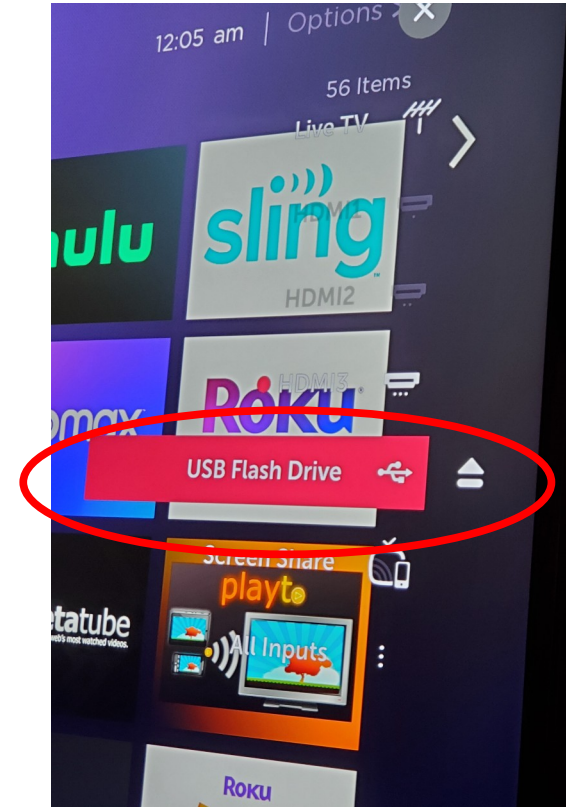
- Moving Picture Experts Group (MPEG) version 4 (MP4) is the lossy file format used for recording Android 4K video and FHD video.
- Not all editors are compatible with all of the many options defined by MPEG for MP4 files,
- I tested the 4K MP4 and MOV files with two entry-level video editors:  
**Vegas Movie Studio 16** (for Windows and Mac)  
**VideoPad v10.36** (a free video editor for Windows)

# Video Editor Compatibility tests

- Does the editor application **load** the video file?
- Does the editor application **preview** the video file?
- Does the editor application allow **video cut & paste**
- Tested on a Windows 10 computer with 8 GB RAM
- All four 4K recording apps produced files that were **completely compatible** with both Vegas Movie Studio 16 and VideoPad v10.36.
- John's Tip: Adjust Windows Paging File size to equal or exceed your RAM size.

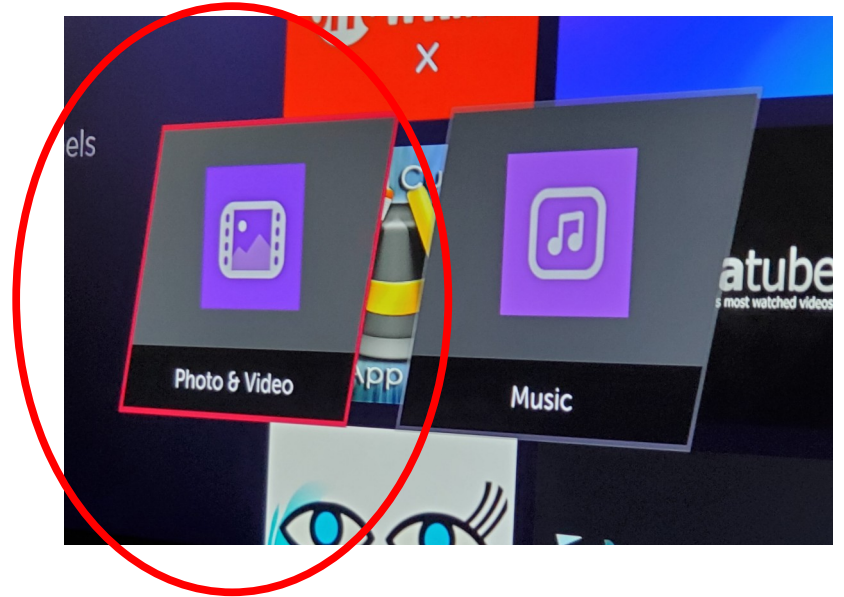
# How to Play 4K video files on an LG 4K HDTV

- 4K HDTV TV will play both MP4 and MOV files
- Place 4K video files on a USB flash drive
- Plug flash drive into 4K HDTV USB port
- Turn on 4K HDTV
- Tap the **Input button** on the remote;  
4K HDTV displays menu of all inputs
- Use remote to select **USB Flash Drive**  
as input for the 4K HDTV



# How to Play 4K video files on an LG 4K Smart HDTV

- 4K HDTV shows a menu: Photo & Video, or Music
- Select **Photo & Video**
- 4K HDTV lists files found on USB flashdrive
- Select file to be played
- 4K HDTV will play the selected 4K video file
- It will also play all the other video files automatically



# Mid-2022 Hardware News

- Low end gaming computers now include 4K video outputs, for instance PowerSpec G230 (\$900)
- Raspberry Pi 4B and 400 models include 4K video outputs
- 27" 4K computer monitors are available at about \$300 price point.
- Amazon Prime Day 2022: Amazon is offering a 43" 4K TV for \$200

**THE END**