

# Epiphan AV.io 4K™



September, 2022

1.0

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# Thank you for choosing Epiphan Video!

At Epiphan Video, product function and quality are our top priority. We make every effort to make sure that our products exceed your expectations.

## Product feedback

Your feedback is important! We regularly contact our customers to ensure our products meet your performance and reliability requirements. We strive to continually enhance our products to accommodate your needs. Please let us know how you think we can improve our products by emailing your suggestions to [info@epiphan.com](mailto:info@epiphan.com).

## Specifications

Go to the Epiphan Video website to get the most recent product specifications and additional information about this product.

## Warranty

All Epiphan Video products are provided with a 100% return to depot warranty for one year from the date of purchase.

## Technical support

Epiphan's products are backed by our professional support team. If you are having issues with your product, please gather details about your system and contact our team by:

- E-mailing [support@epiphan.com](mailto:support@epiphan.com)
- Live chat via the link on our [support site](#)
- Phone toll free at 1-877-599-6581 or call +1 613-599-6581

Be sure to include as much information about your problem as possible, including:

- Problem description
- Details of the video or audio source (type, resolution, refresh rate, etc.)
- Product serial number
- Your operating system and version number

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# Release notes

Version 4.0.0

Firmware 4.0.0 is a maintenance release that fixes some minor issues and improves the memory allocation performance of the AV.io 4K.

What's fixed

- Improved the AV.io 4K image quality when downscaling from 1080p to 720p.
- The audio capture using AV.io 4K is improved and audio no longer gets dropped during capture.

# Registering the device

Why should I register my AV.io 4K?

It will allow you to activate your product warranty, give you notifications of firmware and software updates, and enable you to get our free personalized customer support.

How to register

1. Go to [epiphan.com/register](https://epiphan.com/register)
2. Provide the required information. Your six digit serial number is found on your device. A valid e-mail address is required for product registration.

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# Getting Started

Welcome and thank you for buying Epiphan Video's AV.io 4K!

This guide contains all the information necessary to successfully capture live video content without any configuration – simply connect the cables and you're ready to go!

We'll start off by telling you about the product; giving you an overview, discussing the technical specifications, and more. Then we'll cover capturing video; providing a functional overview of how the product works, as well as some information on common resolutions, and third-party capture applications. Finally, we'll finish with a more detailed look at configuration, including advanced configuration options.

Let's get started!

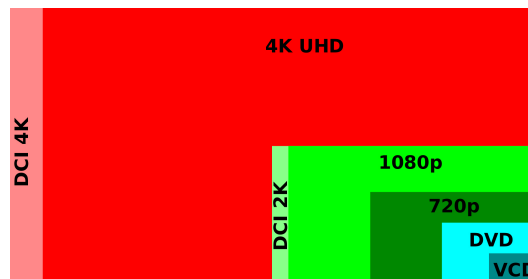
# Product overview

AV.io 4K is the latest addition to Epiphan Video's industry-leading video grabbers product line, adding 4K resolution support while maintaining support for HD and SD resolutions.

To use AV.io 4K, there's no software to install; simply connect the cables and go. It works on Windows, Mac, and Linux and integrates seamlessly with your favorite third-party applications such as Teams, Zoom, OBS, Wirecast, vMix, VLC, and Quicktime.

AV.io 4K captures resolutions up to and including 4096×2160, making it the simplest way available to capture DCI 4K and 4K UHD digital signals.

For those curious as to the difference between DCI 4K and 4K UHD, these are just different definitions of a 4K resolution. 4K UHD (3840×2160) is the standard 4K resolution available on televisions and other common display screens. The 4K resolution of 4096×2160 is referred to as Digital Cinema Initiatives (DCI) 4K, and is the resolution used almost exclusively for cinema-scale film production. It is rare to find this resolution outside of a cinematic context. AV.io 4K is capable of supporting input and output at either.





# What's in the box?

Your AV.io 4K product contains everything you need to easily capture live video content with minimal setup. Your purchase includes the following:

**Table 1** Description of included purchase contents (for identification only, color and appearance of individual cables/adapters may vary).

<p>AV.io 4K video grabber</p>		<p>Your video capture device!</p>
<p>HDMI connector cable (1 m / 3 ft)</p>		<p>Connects an HDMI source to your AV.io 4K's native HDMI port.</p>
<p>USB 3.0 cable (1 m / 3 ft)</p>		<p>The USB 3.0 cable connects your AV.io 4K video grabber with your computer's USB 3.0 or 2.0 port.</p>

# Hardware

This section describes the physical features of your AV.io 4K, including diagrams and hardware feature descriptions.

Topics covered include:

- [Hardware diagrams](#)
- [Indicator LED details](#)

## Hardware diagrams

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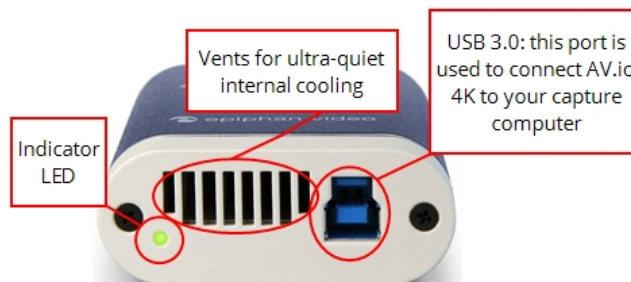
Your AV.io 4K device includes an input, an output, and an indicator light.

Input/output ports and indicator lights are identified and explained in the top and bottom view images below. Indicator light details are explained in the following section.

Top view:



Bottom view:



## Indicator LED details

The color and action of the indicator LED depends on whether you are connected by USB 3.0 or USB 2.0. For maximum performance, always use a USB 3.0 port and the included USB 3.0 cable. Note that frame capture rate will be reduced when connected via USB 2.0.



4K resolutions with USB 2.0 will likely be unstable.

From the operating system's UVC drivers, the application will receive the AV.io 4K supported color space, resolution and frame rates.

If you're not sure if your controller is USB 3.0 or USB 2.0, plug AV.io 4K into the capture computer and look at the indicator LED. After initial boot up (red LED), blue is used for USB 3.0 and green is used for USB 2.0:



Blue LED means USB 3.0



Green LED means USB 2.0

Connection type/LED color	USB 3.0 connection	USB 2.0 connection
Solid red	Firmware update in progress AV.io 4K initializing	Firmware update in progress AV.io 4K initializing
Solid green	N/A	USB 2.0 connection active
Blinking green	N/A	Video and/or audio transferring successfully
Solid blue	USB 3.0 connection active	N/A

Blinking blue	Video and/or audio transferring successfully	N/A
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# Quick start

Setting up your AV.io 4K device to capture live video and audio content couldn't be easier!

Before you begin the connection process, you will require:

- An HD video source (with or without audio)
- Your capture card device
- A capture desktop computer, laptop or notebook
- A USB cable (included with purchase) to connect your AV.io 4K to your capture computer
- An HDMI cable (included with purchase) to connect your video source to your AV.io 4K.

Once you have these things ready to go, you can now begin the simple process of hooking up your AV.io 4K so you can start capturing!

To connect your AV.io 4K for capture:

1. Connect your AV.io 4K device to your video source
2. Connect your AV.io 4K device to your computer
3. (Optional) Connect your audio device to the 3.5 mm audio input.
4. Open your favorite third-party application, select AV.io 4K from the list of available cameras and start capturing!



And that's it. No drivers to install and no extensive set-up. Just connect the cables and you're ready to go!

# Technical specifications

Technical specifications for AV.io 4K are included in the table below.

<b>Operating System support</b>	Windows 8.1, Windows 10, Mac OS X 10.10 and up, Linux distribution with kernel 3.5.0 or higher		
<b>Drivers</b>	Native UVC and UAC device auto-detected by OS		
<b>Processor requirements</b>	Your capture computer processor should be equal or superior in performance to i7 6770HQ for good 4K results.		
<b>Input connector</b>	HDMI		
<b>Input resolution</b>	Standard and non-standard resolution from 640×360 up to 4096×2160 (4K DCI).		
<b>Output connector</b>	USB 3.0 B-Type connector with USB 2.0 backward compatibility		
<b>Output scaling</b>	Choose from: no scaling (1:1), preserve aspect ratio scaling or aspect ratio conversion scaling		
<b>Supported output resolutions</b>		Color space YUY2 (4:2:2)	Color spaces NV12, YV12 and I420 (4:2:0)
	640×360	15, 23.97, 24, 25, 29.97, 30, 50, 59.94 or 60 fps	15, 23.97, 24, 25, 29.97, 30, 50, 59.94 or 60 fps
	640×480		
	960×540		
	1024×768		
	1280×720		
	1280×1024		
	1600×1200		
	1920×1080		
	1920×1200		

	<table border="1"> <tr> <td>2048×1024</td> <td rowspan="5">5, 10, 15, 20 fps</td> <td rowspan="5">15, 23.97, 24, 25, 29.97, 30 fps</td> </tr> <tr> <td>2560×1440</td> </tr> <tr> <td>2560×1600</td> </tr> <tr> <td>3200×1800</td> </tr> <tr> <td>3840×2160 (4K UHD)</td> </tr> <tr> <td>4096×2160 (DCI 4K)*</td> <td>5, 10, 15, 20 fps</td> <td></td> </tr> </table>	2048×1024	5, 10, 15, 20 fps	15, 23.97, 24, 25, 29.97, 30 fps	2560×1440	2560×1600	3200×1800	3840×2160 (4K UHD)	4096×2160 (DCI 4K)*	5, 10, 15, 20 fps	
2048×1024	5, 10, 15, 20 fps	15, 23.97, 24, 25, 29.97, 30 fps									
2560×1440											
2560×1600											
3200×1800											
3840×2160 (4K UHD)											
4096×2160 (DCI 4K)*	5, 10, 15, 20 fps										
<b>USB host controllers</b>	When capturing 4K resolutions we recommend using a computer with an Intel USB host controller (this is the most common type) to achieve the best results. With other USB host controllers such as ASM, AMD, VIA, Renesas, Eltron, Fresco and TI, capture will be at 79% to 96% of the expected frame rate.										
<b>HDMI audio input</b>	Up to 96 kHz sampling rates										
<b>Audio output</b>	16-bit 48 kHz stereo sampling rates										
<b>Capture latency</b>	Near-zero. However, third-party applications may contribute capture delay										
<b>HDCP</b>	High-bandwidth digital content protection (HDCP) protected content cannot be captured										
<b>LED</b>	LED indicates the status of AV.io 4K										
<b>Dimensions</b>	3.54" × 2.36" × 0.91" (90 mm × 60 mm × 23 mm)										

\* Note: For DCI 4K, the actual frame rate is limited to 24 fps for NV12/I420 and 15 fps for YUY2.

## System requirements

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System requirements are the barebones technical essentials your computer needs to work with AV.io 4K. System requirements to use AV.io 4K include:

<b>Video source</b>	Any VESA-compatible HDMI (or DVI-D) source.
<b>Video capture workstation</b>	Any computer (laptop/desktop/other format) with: <ul style="list-style-type: none"><li>• a compatible USB 3.0 host controller for SuperSpeed operation and 4K functionality (for maximum performance, an Intel USB 3.0 host controller is needed); or,</li><li>• a USB 2.0 host controller (will limit maximum frame rate and resolution support)</li></ul>
<b>Video capture workstation operating system</b>	Windows 8.1, Windows 10, and up Mac OS X 10.10 and up Linux distribution with kernel 3.5.0 or higher
<b>Processor frequency</b>	Minimum recommended value: 2.4 GHz
<b>RAM</b>	Minimum recommended value: 4 GB



# Capture

Setting up your AV.io 4K device to capture live video content couldn't be easier!

Before you begin the connection process, you will require:

- An HD video source (with or without audio)
- Your capture card device
- A capture desktop computer, laptop or notebook
- A USB cable (included with purchase) to connect to your AV.io 4K to your capture computer
- An HDMI cable (included with purchase) to connect your video source to your AV.io 4K.

Once you have these things ready to go, you can now begin the simple process of hooking up your AV.io 4K so you can start capturing!

## How AV.io 4K works

Once you're ready to start capturing, you'll need either a built-in or third-party application to capture video and audio content with AV.io 4K.

The application communicates with AV.io 4K and negotiates a **color format** (the range of available colors), **frame rate** (frequency at which frames in a video sequence are displayed) and **frame resolution** (size of a single video frame in pixels). A higher frame rate means smoother video capture while the frame resolution determines the aspect ratio of the video output as well as its dimensions and degree of definition.

With the help of AV.io 4K, the content from your video source is automatically configured and captured on your computer through your selected application. If the application requests a frame size that is smaller or larger than your video source, AV.io 4K automatically scales the video for you. For consistent and widely compatible output, audio is automatically resampled to 16-bit 48 kHz stereo audio.

No configuration required!

# Set up your AV.io 4K for capture

To connect your AV.io 4K for capture:

1. Connect your AV.io 4K device to your video source, ideally directly to the source, but some video sources may require special adapters
2. Connect your AV.io 4K device to your desktop computer, laptop, or notebook
3. Open your favorite third-party application, select AV.io 4K from the list of available input sources, and start capturing!



And that's it! No drivers to install and no extensive set-up! Just connect the cables and you're ready to go!

# Resolutions, aspect ratios, and capture rates

The **resolution** (also known as frame size or display mode) of a video signal, digital image, TV screen, computer monitor or other display device is a count of the number of pixels displayed horizontally and vertically. For example the resolution 1920×1080 (which is 1080p) creates an image that is 1920 pixels wide and 1080 pixels tall.

The **aspect ratio** of an image describes the proportional relationship between its pixel width and height. The resolution 1920×1080 (1080p) is quite a bit wider than it is tall. The ratio of its width to height is 16 to 9, represented as an aspect ratio 16:9.

AV.io 4K outputs resolutions in commonly supported aspects ratios. The table below is a color-coded legend for interpreting the two tables of product resolutions below it:

Aspect Ratio	Common Use
4:3	Standard TV (NTSC/PAL) display and non-widescreen computer displays
16:9	Widescreen (HD) TV displays (1080p, 1080i, 720p etc.), and 4K-capable displays
16:10 (8:5)	Widescreen computer displays, and 4K-capable displays
5:4	Sometimes used in larger format computer monitors
1.90:1	Digital Cinema Initiatives standard resolution for 4K or 2K video projection

AV.io 4K accepts the following inputs by default:

640×480	1024×768	1280×720	1280×800
1280×1024	1440×900	1600×1200	1920×1080
1920×1200	2048×1080	3840×2160	4096×2160

If you're using an input resolution that is not on this list, it might still be possible to capture. However, the video might be stretched, or scaled to a different size and surrounded by black letter-boxing, based on the software and your configuration settings. Read [Configure settings using AV.io Config tool](#) for more detail.

AV.io 4K generates a list of the following possible resolutions for your capture application to select for output display:

<b>640×360</b>	<b>640×480</b>	<b>960×540</b>	<b>1024×768</b>
<b>1280×720</b>	<b>1280×1024</b>	<b>1600×1200</b>	<b>1920×1080</b>
<b>1920×1200</b>	<b>2048×1024</b>	<b>2560×1440</b>	<b>2560×1600</b>
<b>3200×1800</b>	<b>3840×2160</b>	<b>4096×2160</b>	

Captured video content is output to your application , depending on your resolution and color space, at **5, 10, 15, 20, 23.97, 24, 25, 29.97, 30, 50, 59.94 or 60 frames per second** (your application chooses one of these frame rates) when captured over USB 3.0. This table is not an exhaustive list of all the resolutions your AV.io 4K can output, just a list of common and tested resolutions.

When capturing 4K resolutions we recommend using a computer with an Intel USB host controller (this is the most common type) to achieve the best results. With other USB host controllers such as ASM, AMD, VIA, Renesas, Eltron, Fresco and TI, capture will be at 79% to 96% of the expected frame rate.

# Automatic image scaling & audio resampling

If your source content is larger or smaller than the frame size chosen by the application, AV.io 4K automatically **scales your source** to match the desired frame size. No user configuration required!


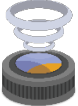



AV.io 4K also automatically performs **audio resampling**, meaning that no matter the bit depth or sampling frequency of audio through an HDMI audio source, AV.io 4K automatically resamples your audio so that your application gets a consistent audio sample rate and bit depth, even if you change the video source.

# Third-party applications

AV.io 4K uses pre-installed drivers on your OS (called **UVC drivers** and **UAC drivers**) to communicate with third-party applications and capture content. Due to AV.io 4K's use of UVC/UAC technology, there is no need for driver installation. Just like a webcam, your AV.io 4K device is immediately recognized as a camera device and can be used to capture content via any UVC-compatible third-party application.

Third-party applications that work with AV.io 4K include, but are not limited to the following list. Try your favorite capture application!

Zero-install applications (included with your OS)		
 <b>Skype</b> (with Windows 8.1 and Windows 10)	 <b>Windows Camera app</b> (with Windows 8.1 and Windows 10)	 <b>QuickTime</b> (with Mac OS X)

Popular applications available for download		
 <b>Skype</b>	 <b>Wirecast</b>	 <b>QuickTime</b>
 <b>Adobe FMLE</b>	 <b>VLC media player</b>	

# Configuration

Your AV.io 4K device is ready to use right out of the box; however, there is support for additional configuration should you need it.

Firmware updates and changes to default capture settings can be applied to your AV.io 4K using Epiphan's AV.io Config tool. For settings to persist after power cycling, please allow 5 seconds before disconnecting or restarting device.

You likely won't need to use the AV.io Config tool for more than firmware updates, but advanced settings can help you tweak the performance to get the most out of your AV.io 4K.

Advanced configuration options include:

- **Use input signal resolution**
- **Preserve aspect ratio**
- **Performance mode**



The option **Audio selector for multichannel inputs** does not apply to AV.io 4K.

Detailed instructions on how to use AV.io Config include:

- Install the AV.io Config tool
- Update firmware using the AV.io Config tool
- Identify input details using the AV.io Config tool
- Configure settings using AV.io Config tool
- Advanced Settings
- Set custom resolution user modes



# Install the AV.io Config tool

Epiphan's AV.io Config tool is used for loading firmware updates on your AV.io 4K and for advanced settings changes.



You may install AV.io Config on the same computer(s) where you use AV.io 4K, or only on one computer for configuration. All firmware updates and settings changes are saved to the device and work without any software installed on the computer. For settings to persist after power cycling, please allow 5 seconds before disconnecting or restarting device.

To install the AV.io Config tool, follow the directions below for your computer's operating system.

## Windows

1. Download the AV.io Config package under the **Windows** heading on the AV.io 4K Downloads page on Epiphan's web site.  
<https://www.epiphan.com/support/avio-4k-software-documentation/>
2. Extract all the files from the zip file (remember the location you're unzipping to).
3. Browse to the unzip folder and open the AV.io Config tool by double-clicking on **AVioConfig.exe**. (Depending on your local security settings, you may need to right-click and choose to run the file as an administrator).
4. AV.io Config starts! If you video grabber is connected to the computer by USB, it is detected.



Mac

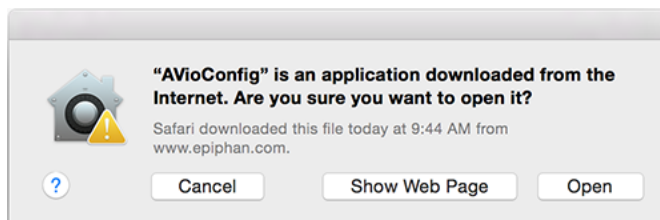
1. Download the AV.io Config package under the **Mac OS X** heading on the AV.io 4K Downloads page on Epiphan’s web site.

<https://www.epiphan.com/support/avio-4k-software-documentation/>

2. Double-click the downloaded file to open the disk image package.



3. If desired, drag the AVioConfig application to your desktop or another location where you will find it for future use.
4. Double-click the AVioConfig application icon to launch AV.io Config; a warning box appears.



5. Click **Open**.
6. AV.io Config starts! If you video grabber is connected to the computer by USB, it is detected.



## Linux

1. Download the AV.io Config package under the **Linux** heading on the AV.io 4K Downloads page on Epiphan's web site.  
<https://www.epiphan.com/support/avio-4k-software-documentation/>
2. Untar and unzip the contents of the .tar.bz2 file (tar -xjvf can be used to untar and unzip in one command).
3. Browse (or change directories) to the unzip folder.
4. Either: Double-click the AV.io Config application icon or execute the AV.io Config application from the command line to launch AV.io Config (./AVioConfig).
5. AV.io Config starts! If you video grabber is connected to the computer by USB, it is detected.



# Update firmware using the AV.io Config tool

When new firmware is available, you can load this firmware onto your AV.io 4K using the AV.io Config tool and the steps below. If you [register your product](#) and agree to be notified of product updates, you'll receive an email when there is a firmware update available for download.



Attempting to update firmware while running virtual machines will result in firmware upgrade failure. For updates to persist after power cycling, please allow 5 seconds before disconnecting or restarting device.

To update firmware using the AV.io Config tool:

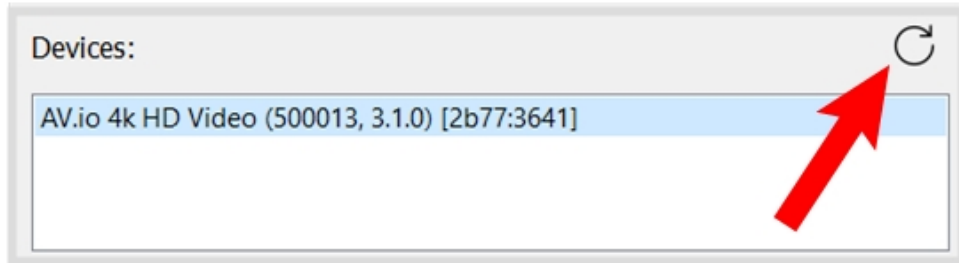
1. If you haven't already done so, download and install the AV.io Config tool. See [Install the AV.io Config tool](#).
2. Download the firmware update file from the Epiphan website, as described in your firmware update notification email or discussion with your vendor.
3. Connect your AV.io 4K device to your computer, laptop or notebook.
4. Open the AV.io Config tool.



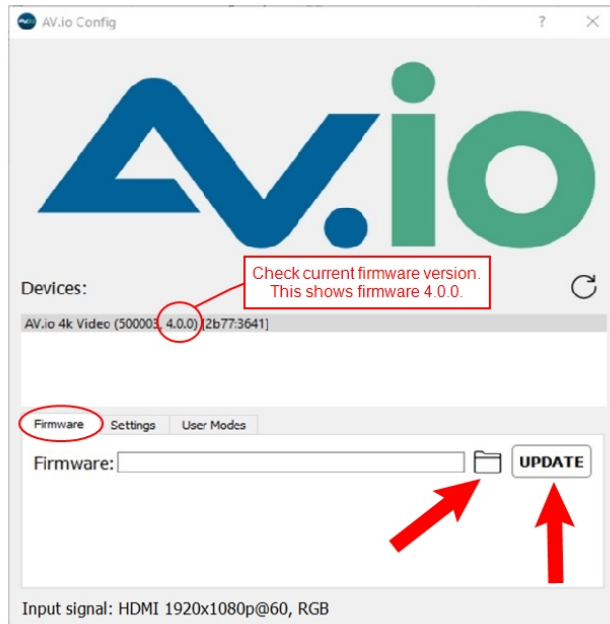
5. Select your AV.io 4K device from the list under the Devices heading.



If your AV.io 4K device is not displayed, press the Refresh icon to refresh the list of connected devices.



- 6. Using the diagram below, check the current firmware version of your AV.io 4K. If it is the same version as the new firmware you downloaded, there is no need to do the firmware update.
- 7. Click the **Firmware** tab

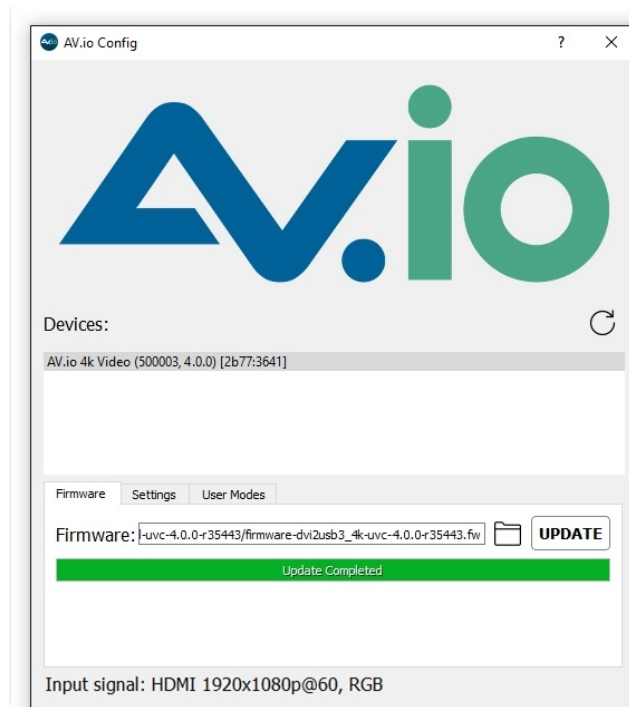


- 8. Click the **folder icon** to navigate to the saved location of the firmware, and click **Update** to update your video grabber to the selected firmware; an update bar appears and displays the progress of the update.



Do not disconnect your AV.io 4K at any point during the update process! Doing so may cause irrevocable errors and/or permanently damage the device.

- When the update is finished the progress bar turns green and displays "Update Completed" (Note the firmware update will not be automatically reflected in the Devices list unless the **Refresh** icon is clicked). You may now safely disconnect your AV.io 4K if needed.



When updating firmware on a Mac, the "Update Completed" text will not be displayed. The firmware upgrade is complete when the progress bar fills the width of the AV.io Config window and the window contents are no longer greyed out.

## Identifying the input resolution

The AV.io Config tool can help you figure out exactly what information your video source is sending. Plug in the source and select your device. The UI detects information about the source and presents it at the bottom of the window.



The line tells you what connector the video source is using, the exact resolution of the source (1920×1080p), and the frame rate the source is outputting (60 fps), and the color model (RGB or YCrCb in these examples).



## Configure settings using AV.io Config tool

Epiphan's AV.io Config tool gives advanced users the ability to change several settings to their video capture experience. The settings that can be changed include: Re-numerate input signal resolution, aspect ratio preservation and performance mode. For settings to persist after power cycling, please allow 5 seconds before disconnecting or restarting device. See [Advanced Settings](#) for more details.

To change the configurable settings with the AV.io Config tool:

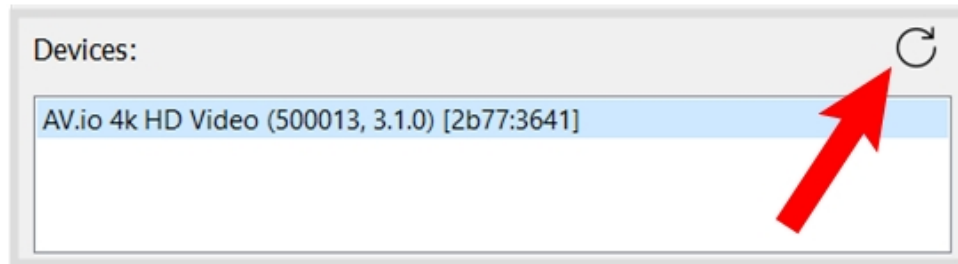
1. If needed, install the AV.io Config tool. For details specific to your OS, see [Install the AV.io Config tool](#).
2. Connect your AV.io 4K device to your computer, laptop or notebook.
3. Open the AV.io Config tool.



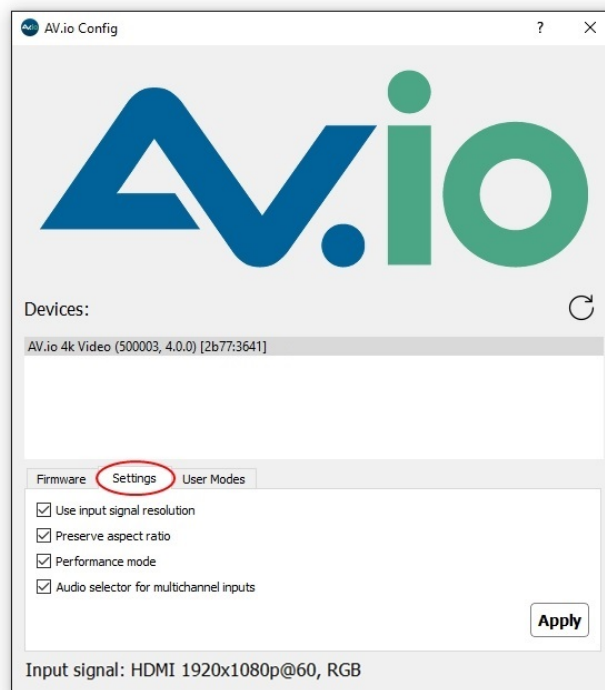
4. Select your AV.io 4K device from the list under the Devices heading.



If your video grabber is not displayed, press the Refresh icon to refresh the list of connected devices.



5. Click the **Settings** tab; the settings page appears.



6. Enable or disable the individual settings by clicking each checkbox according to your needs, then click **Apply**. See [Advanced Settings](#) for a description of each setting.
7. Disconnect and then reconnect the grabber.

## Advanced Settings

The AV.io Config tool allows you to change several settings to make changes to your video capture experience if necessary. Most users won't need to use this utility for anything other than firmware updates, but advanced users may find these tweaks help them get the most out of their AV.io 4K.

These options include:

- **Use input signal resolution**
- **Preserve aspect ratio**
- **Performance mode**



The option **Audio selector for multichannel inputs** does not apply to AV.io 4K.

Use input signal resolution (disabled by default)

There are two key descriptors used in the process of video capture using a UVC-based device:

**Extended Display Identification Data (EDID):** The EDID describes to the video source, video player or computer which standard video formats (resolutions, frame rates, etc.) are supported by the capture device as video input.

**UVC Descriptor:** The UVC describes to the capture host computer which formats are available at the capture device USB port.

AV.io 4K does not enforce a direct relationship between the input and output signals. The list of EDID and UVC descriptions are identical so that if the input and output formats are the same, the signal can pass through without scaling. However, if input and output are set to different formats, AV.io 4K will automatically upscale or downscale video to the format requested as output by the capture software.

The **Use Input Signal Resolution** option allows you to use a video format that is not included on the EDID or UVC descriptors. When **Use Input Signal Resolution** is selected in the AV.io config tool, the input signal format is added to the UVC descriptor, which allows a 1:1 capture from the input video source. If the program you are using is compatible with the signal, you can capture your source in its original format.

For example, if your video resolution was 1680×1200, a resolution which is not on the EDID or UVC descriptor list, normally you would have to select the closest possible resolution from the provided output descriptor list in your capture application, and then AV.io 4K would automatically scale the video up or down to that format. However, if you select the **Use Input Signal Resolution** option, your capture application's list will have 1680×1200 as an option for output format.

There are two scenarios in which this feature will not perform as expected.

1. Not all third-party applications are able to support custom resolutions. AV.io 4K will send the custom resolution to the application, but if it is unable to use the resolution, the application will override any AV.io 4K custom capture settings.
2. In a Windows environment, due to restrictions set by Microsoft's Windows Hardware Quality Labs certification, most graphics adapters or drivers will not output resolutions not included in the EDID file of the connected display device. In the scenario where a resolution that is not included in the AV.io 4K standard resolution is requested, the Graphics adapter and driver will apply the resolution requested and then upscale it to AV.io 4K's default resolution. This means the **Use input signal resolution** feature will not add a custom resolution to the UVC descriptor and the capture software will be limited to the pre-defined resolutions.

Outside of these restrictions, the feature is recommended in any scenario where you wish the resolution of your captured video to be identical to the original video source.

Preserve aspect ratio (enabled by default)

When enabled, your AV.io 4K preserves the aspect ratio of your input signal by adding black bars to the sides or top and bottom of the frame (only for cases when the application using the signal requests a frame size with a different aspect ratio). For example, with this option enabled, a 4:3 input signal gets black bars added to the sides of the image when viewed in an application that requests a 16:9 aspect ratio. With this option disabled, the 4:3 image is instead stretched to fit the full 16:9 size.

Performance mode (enabled by default)

When enabled, your AV.io 4K enters and exits system suspend mode (i.e. sleep) faster by disabling support for the Suspend/U3 USB power state. This means AV.io 4K starts working again faster after your computer wakes from a system suspend state, at the cost of increased power consumption. Disabling this setting is ideal in situations where power consumption needs to be monitored, such as battery preservation in laptops.

Now that you've learned what these configuration settings do, you may want to [Configure settings using AV.io Config tool](#) or [Update firmware using the AV.io Config tool](#).

## Set custom resolution user modes

The AV.io Config tool gives users the ability to specify custom resolutions. You can make use of up to three at one time, so you don't have to worry about changing the list every time you change which source you have connected. For settings to persist after power cycling, please allow 5 seconds before disconnecting or restarting device.

To change the custom resolutions with the AV.io Config tool:

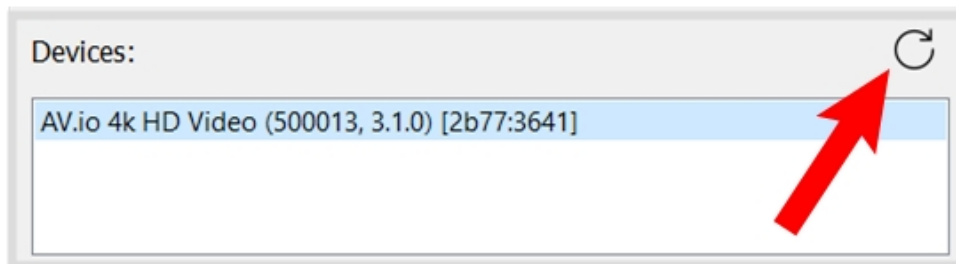
1. If needed, install the AV.io Config tool. For details specific to your OS, see [Install the AV.io Config tool](#).
2. Connect your AV.io 4K device to your computer, laptop or notebook.
3. Open the AV.io Config tool.



4. Select your AV.io 4K device from the list under the Devices heading.



If your video grabber is not displayed, press the Refresh icon to refresh the list of connected devices.



5. Click the **User modes** tab; the User modes page appears.



6. To create a custom resolution, click the check box for one of the user modes. The grayed-out area becomes open for changes.
7. Select the text box labeled **Width**, erase the number that is currently in the box, and type out the width of the custom resolution you wish to use. Then do the same for the resolution height in the text box labeled **Height**.
8. Click **Apply**; The custom resolution you defined will now be added to the list of output resolutions that you are allowed to select from the settings menu from the third-party application of your choice.



9. If needed, you may follow the same process for **User mode 2** and **User mode 3**. If all three are checked and applied, all three custom resolutions selected will appear in the list of resolutions. You may change the definition of any of these three resolutions at any time.

There are two scenarios in which this feature will not perform as expected.

1. Not all third-party applications are able to support custom resolutions. AV.io 4K will send the custom resolution to the application, but if it is unable to use the resolution, the application will override any AV.io 4K custom capture settings.
2. In a Windows environment, due to restrictions set by Microsoft's Windows Hardware Quality Labs certification, most graphics adapters or drivers will not output resolutions not included in the EDID file of the connected display device. In the scenario where a resolution that is not included in the AV.io 4K standard resolution is requested, the Graphics adapter and driver will apply the resolution requested and then upscale it to AV.io 4K's default resolution. This means the **User modes** feature will not add the custom resolutions to the UVC descriptor and the capture software will be limited to the pre-defined resolutions.

Outside of these restrictions, the feature is recommended in any scenario where you wish to use a custom output resolution.

# Appendices

The following appendices are included in this section:

- [Troubleshooting](#)
- [Limitations and known issues](#)
- [Releases and features](#)



# Troubleshooting

Use the follow table for help if you are experiencing problems or unexpected behavior from your AV.io 4K.

Symptom(s)	Action(s) to resolve
Device not detected after interrupted firmware update	(Windows only) When in the config tool press F12 to enter firmware recovery mode, then select a firmware file and click update to forcibly reflash the capture card.
Applications cannot open the capture card when a custom UVC mode is set	Please make sure that the card is connected via USB 3.0 for all modes to be valid; only low frame rate modes are valid when connecting via USB 2.0

Affecting all operating systems

Symptom(s)	Action(s) to resolve
Frame rates lower than 30 fps at 4K resolutions	<p>1) Optimize performance by using an Intel USB host controller.</p> <p>2) Use your application to change the color space you are using. At 4K resolutions, NV12 and I420 (4:2:0) are available at 15, 23.97, 24, 25, 29.97, or 30 fps, and YUY2 (4:2:2) is available at 5, 10, 15, or 20 fps.</p>

Affecting Windows

Symptom(s)	Action(s) to resolve
Incorrect input resolutions detected	If using <b>Windows 8.1 or 10</b> with <b>VLC Media Player 2.2.1</b> , downgrade to an earlier version of VLC or use a different capture application, such as Adobe FMLE.
Not able to capture UHD resolutions at 30 fps when using VLC	VLC does not support the NV12 (4:2:0) colorspace. 4K must be captured in either the YUY2 (4:2:2) colorspace, which will reduce the

	frame rate to 20 fps, or I420 (4:2:0) which will allow you to capture at speeds of up to 30 fps.
Audio artifacts are present (popping, missing audio, poorly encoded audio, etc).	<p>If using <b>Windows 8.1 or 10</b> with <b>VLC Media Player 2.2.1</b>, downgrade to an earlier version of VLC or use a different capture application, such as Adobe FMLE.</p> <p>OR</p> <p>If using <b>Windows 8.1 or 10</b> with <b>Skype for Business</b>, use a different capture application, such as Adobe FMLE.</p>
Captured video file displays black screen when opened.	If capturing on <b>Windows 8.1</b> using <b>Windows Movie Maker</b> with your AV.io 4K connected to an <b>Etron EJ188H USB 3.0/2/0 host controller</b> , switch to a different capture application, connect to a different USB port, or upgrade to Windows 10.
Recorded file does not have audio.	If capturing on <b>Windows 8.1</b> using <b>Windows Camera</b> with your AV.io 4K connected to a <b>Texas Instruments TSub USB 3.0 controller</b> , switch to a different capture application (such as VLC Media Player) or upgrade to Windows 10.
Firmware update fails	If updating on a computer running Windows <b>8.1 or 10</b> with your AV.io 4K connected to an <b>Etron 3.0 host controller</b> , perform the firmware update on another computer (without an Etron USB host controller) or using another USB port on the same computer. Note that USB 2.0 can be used for firmware updates.

Affecting Mac

Symptom(s)	Action(s) to resolve
Recorded file does not have audio.	If using <b>VLC Media Player 2.2.1</b> , downgrade to an earlier version or use a different capture application, such as Quicktime.
Quicktime crashes when using a frame grabber to	This issue is with the Operating System itself,

<p>record video in MacOS 10.12</p>	<p>and affects all brands of video grabbers. Quicktime is able to show a preview of the recording, but then sometimes crashes as soon as the recording starts. This problem can be circumvented by selecting the Maximum Quality Recording option in the Quicktime drop-down menu.</p>
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Affecting Ubuntu

Symptom(s)	Action(s) to resolve
<p>Video cannot be resumed if stopped during a Skype call.</p>	<p>If capturing on <b>Ubuntu 14.04 LTS</b> with your AV.io 4K connected to an <b>Etron EJ168A USB 3.0 controller</b>, switch to a different USB port or simply avoid stopping the Skype call. If it is not possible to stop the Skype call or if it stops accidentally, disconnect and reconnect the device. You may need to restart the video call.</p>

Affecting Chromebook

Symptom(s)	Action(s) to resolve
<p>AV.io 4K is not detected as a valid audio device.</p>	<p>If capturing using <b>Chromebook Apps Clipchamp</b> and <b>WebRTC</b> on Google <b>Chrome OS v43.0.2357.125 (64 bit)</b>, use a different Chromebook app to capture both video and audio, such as Screencastify or MediaCore Capture.</p>

## Limitations and known issues

This section includes known issues or limitations that affect functionality or usability. It also has ways that you can work around these limitations.

### Affecting Asmedia USB 3.0 controller ASM3142

- There is an issue that presents as an audio problem when using this USB 3.0 controller
  - **Workaround:** Update the driver for the USB controller

### Affecting systems with an AMD Ryzen 7 CPU

- There is an issue that presents as an audio problem when using older drivers
  - **Workaround:** Update the chipset drivers for your CPU.

### Affecting all operating systems

- **UVC-314:** With the exception of the first capture after system reboot, the very first captured frame is always green.
  - **Workaround:** Remove the green frame in post-production editing. If streaming the captured video, begin streaming after the initial green frame has already been captured.
- **UVC-451:** When using an Eltron EJ198 USB 3.0 host controller via USB 3.0 cable, several error messages might appear. These should not affect the functionality of the device.
  - **Workaround:** If the problem does affect functionality, a different USB 3.0 host controller must be used.
- **UVC-438:** When capturing from a source at 720p, 50 fps will occasionally detect as 51 fps, and when capturing at 1600×1200, 60 fps will occasionally detect as 61 fps.
  - **Workaround:** None necessary. This often occurs due to inherent inaccuracies in rounding decimal point fps rate to whole numbers. The reading is still accurate to your expected rate.
- **UVC-346:** When capturing from a source with a 23.98p, 29.97p or 59.94i signal, frame rate occasionally dips before returning to its original capture rate.
  - **Workaround:** Set your source frame rate to a different value, such as 30 or 60 fps.
- **UVC-576:** The grabber does not capture video from monitors with resolutions of 1920×1080p at 144Hz or higher.
  - **Workaround:** Resolutions of 1920×1080p at 144Hz exceed the hardware limits of the grabber. There is no workaround.

### Affecting Windows

- **UVC-270:** Windows 10: Sometimes, Windows 10 will not recognize the grabber properly when connected by a Fresco FL1100 USB 3.0 controller.
  - **Workaround:** Press the refresh icon to refresh the device list or unplug and reconnect the USB. If neither of these work, a different USB 3.0 host controller might be required.
- **UVC-390:** Windows 8.1: On rare occasions (< 5% of the time), captured video has a small vertical fluctuation (of a few pixels) or small artifacts in the lower right quadrant of the screen. This is noticeable right from the beginning of capture.
  - **Workaround:** Start capturing a few moments before your recording or streaming event and check vertical position and the lower right quadrant of the captured image. If any issues are noticed, disconnect and re-connect AV.io 4K's USB 3.0 cable to the capture computer.

#### Affecting Mac

- Your grabber works best with systems that are running the latest version of the Mac OS. If your system is running an older version and you experience issues with your grabber, we recommend that you update your system to the latest Mac OS.
- **UVC-613:** VLC doesn't play audio for video that is captured using AV.io 4K when connected to a USB 2.0 port on the Mac.
  - **Workaround:** Use another media player such as QuickTime.
- **UVC-450:** Device does not boot when connected to Mac USB 3.0 port with USB 2.0 cable.
  - **Workaround:** Wait for 20-30 seconds. If device still does not boot, it will be necessary to use the USB 3.0 cable.

#### Affecting Ubuntu

- **UVC-454:** When saving settings, device does not seem to save changes.
  - **Workaround:** The most likely cause is caching. After saving changes, wait 10-15 seconds before rebooting, turning off or unplugging your device.
- **UVC-601:** The grabber doesn't capture audio and video when using an AMD Ryzen™ 3.0 USB host controller on Ubuntu.
  - **Workaround:** A different USB 3.0 host controller must be used.

# Releases and features

This section outlines the features introduced with AV.io 4K firmware releases.

## Release 3.1.0 features

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- I420 Color space

The I420 and YV12 color spaces give increased functionality at 4K resolutions, ensuring that AV.io 4K is compatible with a greater number of third-party softwares. Read more details in the [Resolutions, aspect ratios, and capture rates](#) and [Technical specifications](#) sections.

- New default resolutions

Several new default output resolutions were added, namely 1920×1200, 2048×1024, 2560×1440, 2560×1600 and 3200×1800. Read more details in the [Resolutions, aspect ratios, and capture rates](#) and [Technical specifications](#) sections.

- Use input signal resolution button

Previous versions of AV.io Config software have allowed for you to pass through the resolution of your input source as the resolution of the output source, but 3.1.0 has some updates on how this works. See [Advanced Settings](#) for more details.

- Custom resolution creation

You can now create a list of up to three custom resolutions that can be used as output formats. You can add these in the [Set custom resolution user modes](#) tab of the AV.io Config software.

- Significant changes to limitations, known issues and troubleshooting

Many changes have been made since the last firmware release for AV.io 4K. There have been lots of improvements to the efficiency and functionality. See [Limitations and known issues](#) and [Troubleshooting](#) for more details.

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## **Environmental Information**

The equipment that you bought has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment. In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems. Those systems will reuse or recycle most of the materials of your end life equipment in a sound way. The crossed-out wheeled bin symbol invites you to use those systems. If you need more information about collection, reuse and recycling systems, please contact your local or regional waste administration. You can also contact us for more information on the environmental performance of our products.

## **Important Safety Warnings**

WARNING: This product has no user-serviceable parts and the battery used in this device is not replaceable. Do not attempt to disassemble. Return the device for service.

CAUTION, RISK OF ELECTRIC SHOCK: This device may have multiple AC power cords installed. All power sources shall be disconnected before servicing to avoid shock hazard.

ATTENTION: Cet appareil ne contient aucun composant pouvant être entretenu ou réparé par l'utilisateur. En cas de panne, retourner l'appareil pour réparation.

ATTENTION, RISQUE DE CHOC ÉLECTRIQUE: Cet appareil peut être équipé de multiples cordons d'alimentation en courant alternatif. Pour placer cet appareil hors tension, débrancher tous les cordons d'alimentation sans exception.

### **FCC Compliance Statement**

47 CFR Section 2.1077 Compliance Information

Unique identifier: AV.io 4K

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference
2. This device must accept any interference received, including interference that may cause undesired operation.

Responsible party (US contact):

Epiphan Video  
459 Hamilton Avenue, Suite 301  
Palo Alto, CA  
94301, USA

[www.Epiphan.com](http://www.Epiphan.com)

### **FCC CAUTION**

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### **Innovation, Science and Economic Development Canada:**

This device complies with ICES-003 of the ISED rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Cet appareil est conforme à la norme ISED NBM-003 pour les appareils radio agréés. Son fonctionnement est sujet aux deux conditions suivantes:

(1) le dispositif ne doit pas produire de brouillage préjudiciable, et

(2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

### **CE Compliance Statement**

Marking by the symbol **CE** indicates compliance of this device with the applicable directives of the European Community and meets or exceeds the following technical standards:

Directive 2014/30/EU - Electromagnetic Compatibility

Directive 2011/65/EU - RoHS, restriction of the use of certain hazardous substances in electrical and electronic equipment



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