Output

Output panel.

This panel provides options for setting the location of rendered frames for animations, and the quality of the saved images.

File Path

Choose the location to save rendered frames.

When rendering an animation, the frame number is appended at the end of the file name with four padded zeros (e.g. `image0001.png`). You can set a custom padding size by adding the appropriate number of `#` anywhere in the file name (e.g. `image_##_test.png` translates to `image_01_test.png`).

This setting expands Relative Paths where a `//` prefix represents the directory of the current blend-file.

Saving

File Extensions

Adds the correct file extensions per file type to the output files.

Cache Result

Saves the rendered view layers and their passes to a multi-layer OpenEXR image. The Compositor can then use this file to improve performance, especially for heavy compositing.

The image is stored in the *Render Cache* folder as specified in the File Paths Preferences. You can also load it back into the Image Editor's Render Result, even after closing and reopening Blender; see Open Cached Render.

File Format

Choose the file format to save to. Based on which format is used, other options such as channels, bit depth and compression level are available.

For rendering out to images see: saving images, for rendering to videos see the Encoding panel.

Color

The color format to save the image or video to. This setting is used by some formats to optimize how much data is written to the file. Note, *RGBA* not available for all image formats, check the list above for details.

BW:

Saves the image using grayscale colors.

RGB:

Saves red, green and blue channels

RGBA:

Saves red, green, blue and alpha channels.

Image Sequence

Overwrite

Overwrite existing files when rendering.

Placeholders

Create empty placeholder frames while rendering.

Color Management

This panel controls how Color Management is applied when saving images.

Follow Scene:
    Uses the same color management settings defined by the active Scene. These properties are defined in the Render Settings

Override:
    Uses custom color management settings defined by the properties below in the panel; disregarding any color management settings set at the Scene level.
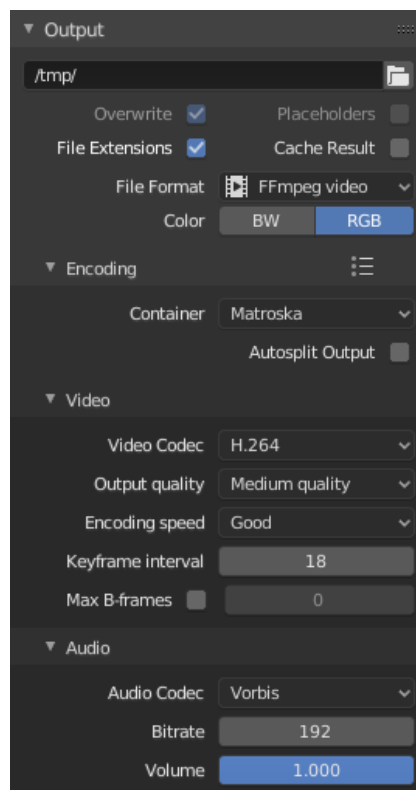
For a detailed description of color management properties, see the Color Management page.

Encoding

Encoding panel.

Here you choose which video container, codec, and compression settings you want to use. With all of these compression choices, there is a trade-off between file size, compatibility across platforms, and playback quality. In the header, you can use the presets, which choose optimum settings for you for that type of output.

Tip

When you view the System Console, you can see some of the output of the encoding process. You will see even more output if you execute Blender as `blender -d`.

Container

Video container or file type. For a list of all available options, see video formats.

Autosplit Output

If your video is huge and exceeds 2GiB, enable Autosplit Output. This will automatically split the output into multiple files after the first file is 2GiB size.

Video

Video Codec

Chooses the method of compression and encoding. For a list of all available options see video formats.

> Note
>
> Standards
>
> Some containers and codecs are not compatible with each other, so if you are getting errors check that your container and codec are compatible. Like containers and codecs are sometimes not compatible with each other, some codecs do not work with arbitrary dimensions. So, try to stick with common dimensions or research the limitations of the codec you are trying to use.

Color Depth

The exponent value (with base two) for how many colors can be represented within a single color channel. A higher bit depth will allow more possible colors, reducing banding, and increasing precision. Yet a higher bit depth will increase memory usage exponentially.

Note, not all file formats support every color depth configuration.

8:

Allows 256 levels per channel, resulting in approximately 16.7 million total colors (RGB). This is the most common format for on-screen graphics and standard video.

10:

Allows 1,024 levels per channel, resulting in over 1 billion total colors (RGB).

Available for H.264, H.265, and AV1 codecs.

12:

Allows 4,096 levels per channel, resulting in over 68 billion total colors (RGB).

Available for H.265 and AV1 codecs.

Output Quality

These are preset Rate.

Encoding Speed

Presets to change between a fast encode (bigger file size) and more compression (smaller file size).

Keyframe Interval

The number of pictures per Group of Pictures. Set to 0 for "intra_only", which disables inter-frame video. A higher number generally leads to a smaller file but needs a higher-powered device to replay it.

Max B-frames

Enables the use of B-frames.

Interval

The maximum number of B-frames between non-B-frames.

Rate

Bitrate

Sets the average bit rate (quality), which is the count of binary digits per frame. See also: FFmpeg -b:v.

Minimum / Maximum

Video files can use what is called variable bit rate (VBR). This is used to give some segments of the video less compressing to frames that need more data and less to frames with less data. This can be controlled by the *Minimum* and *Maximum* values.

Buffer

The decoder bitstream buffer size.

Mux Rate

Maximum bit rate of the multiplexed stream. Multiplexing is the process of combining separate video and audio streams into a single file, similar to packing a video file and MP3 audio file in a zip-file.

Mux Packet Size

Reduces data fragmentation or muxer overhead depending on the source.

Audio

These settings change how sound is exported while rendering. To control how sound is played back from within Blender, see the audio settings in the Preferences.

Audio Codec

Audio format to use. For a list of all available options, see video formats.

Audio Channels

The number of audio source "locations" to encode.

Mono:

Output a single audio channel.

Stereo:

Output two audio channels; typically a left and right channel.

4 Channels:

Output a four audio channels.

5.1 Surround:

Output a five audio channels with one LFE channel.

7.1 Surround:

Output a seven audio channels with one LFE channel.

Sample Rate

Sets the audio sampling rate.

Bitrate

For each codec, you can control the bit rate (quality) of the sound in the movie. Higher bit rates are bigger files that stream worse but sound better. Use powers of 2 for compatibility.

Volume

Sets the output volume of the audio.

Tips

> Tip
>
> The choice of video format depends on what you are planning to do.
>
> It's not recommended to render directly to a video format in the first instance. If a problem occurs while rendering, the file might become unplayable and you will have to re-render all frames from the beginning. If you first render out a set of static images such as the default PNG format or the higher-quality OpenEXR (which can retain HDR pixel data), you can combine them as an Image Strip in the Video Sequencer. This way, you can easily:
>
> - Restart the rendering from the place (the frame) where any problem occurred.
> - Try out different video encoding options in seconds, rather than minutes or hours as encoding is usually much faster than rendering the 3D scene.
> - Enjoy the rest of the features of the Video Sequencer, such as adding Image Strips from previous renders, audio, video clips, etc.

> **Tip**
>
> You shouldn't post-process a lossy-compressed file as the compression artifacts may become visible. Lossy compression should be reserved as a final 'delivery format'.

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