

Types of Apple ProRes Codecs

The Apple ProRes format comes in five versions: Apple ProRes 4444, Apple ProRes 422 (HQ), Apple ProRes 422, Apple ProRes 422 (LT), and Apple ProRes 422 (Proxy). The following list describes the features of each version.

Apple ProRes 4444

The Apple ProRes 4444 codec offers the utmost possible quality for 4:4:4 sources and for workflows involving alpha channels. It includes the following features:

- Full-resolution, mastering-quality 4:4:4:4 RGBA color (an online-quality codec for editing and finishing 4:4:4 material, such as that originating from Sony HDCAM SR or digital cinema cameras such as RED ONE, Thomson Viper FilmStream, and Panavision Genesis cameras). The R, G, and B channels are lightly compressed, with an emphasis on being perceptually indistinguishable from the original material.
- Lossless alpha channel with real-time playback
- High-quality solution for storing and exchanging motion graphics and composites
- For 4:4:4 sources, a data rate that is roughly 50 percent higher than the data rate of Apple ProRes 422 (HQ)
- Direct encoding of, and decoding to, RGB pixel formats
- Support for any resolution, including SD, HD, 2K, 4K, and other resolutions
- A Gamma Correction setting in the codec's advanced compression settings pane, which allows you to disable the 1.8 to 2.2 gamma adjustment that can occur if RGB material at 2.2 gamma is misinterpreted as 1.8. This setting is also available with the Apple ProRes 422 codec.

Apple ProRes 422 (HQ)

The Apple ProRes 422 (HQ) codec offers the utmost possible quality for 4:2:2 or 4:2:0 sources (without an alpha channel) and provides the following:

- Target data rate of approximately 220 Mbps (1920 x 1080 at 60i)
- Higher quality than Apple ProRes 422

Apple ProRes 422

The Apple ProRes 422 codec provides the following:

- Target data rate of approximately 145 Mbps (1920 x 1080 at 60i)
- Higher quality than Apple ProRes 422 (LT)

Apple ProRes 422 (LT)

The Apple ProRes 422 (LT) codec provides the following:

- Roughly 70 percent of the data rate of Apple ProRes 422 (thus, smaller file sizes than Apple ProRes 422)
- Higher quality than Apple ProRes 422 (Proxy)

Apple ProRes 422 (Proxy)

The Apple ProRes 422 (Proxy) codec is intended for use in offline workflows and provides the following:

- Roughly 30 percent of the data rate of Apple ProRes 422
- High-quality offline editing at the original frame size, frame rate, and aspect ratio
- High-quality edit proxy for Final Cut Server

Apple ProRes Format Specifications

With the Apple ProRes format, you can work in a wide variety of frame sizes, frame rates, bit depths, and even color sample ratios.

Frame Dimensions Supported in Final Cut Pro with Real-Time Playback

Although the Apple ProRes format itself supports virtually any frame size, the Final Cut Pro RT Extreme real-time effects architecture supports the following Apple ProRes frame sizes only:

- 720 x 480
- 720 x 486
- 720 x 576
- 960 x 720
- 1280 x 720
- 1280 x 1080
- 1440 x 1080
- 1920 x 1080
- 1024 x 512
- 1024 x 576
- 2048 x 1024
- 2048 x 1080 (Apple ProRes 4444 only)
- 2048 x 1152

- 2048 x 1556 (Apple ProRes 4444 only)

Scanning Method

The Apple ProRes format supports both interlaced and progressive scan images and preserves the scanning method used in the source material.

Color Recording Method

The Apple ProRes format supports the following digital video signals:

- RGB
- 4:2:2 Y'CBCR
- 4:4:4 Y'CBCR

Data Rates

The actual data rate of Apple ProRes codecs depends on the dimensions, frame rate, image complexity, and quality setting you are using.

The Apple ProRes format has a target data size for every frame, regardless of complexity, but allows frames to fall short of that target if they are simple (if they cannot benefit in quality from using more bits). Such a shortfall is not reclaimed for other frames; instead, it just produces a smaller overall file.

The following table shows several sample data rates. The Apple ProRes codecs are designed to target the data rates shown. Because most sequences contain simple frames, actual bit rates are typically 5 to 10 percent lower than these targets.

Frame dimensions	Frame rate	Apple ProRes 4444 data rate	Apple ProRes 422 (HQ) data rate	Apple ProRes 422 data rate	Apple ProRes 422 (LT) data rate	Apple ProRes 422 (Proxy) data rate
720 x 486	23.98 fps	75 Mbps	50 Mbps	34 Mbps	23 Mbps	10 Mbps
720 x 486	25 fps	79 Mbps	52 Mbps	35 Mbps	24 Mbps	10 Mbps
720 x 486	29.97 fps	94 Mbps	63 Mbps	42 Mbps	29 Mbps	12 Mbps
720 x 576	23.98 fps	88 Mbps	59 Mbps	39 Mbps	27 Mbps	12 Mbps
720 x 576	25 fps	92 Mbps	61 Mbps	41 Mbps	28 Mbps	12 Mbps
720 x 576	29.97 fps	110 Mbps	73 Mbps	49 Mbps	34 Mbps	15 Mbps
960 x 720	23.98 fps	113 Mbps	75 Mbps	50 Mbps	35 Mbps	15 Mbps
960 x 720	25 fps	118 Mbps	79 Mbps	52 Mbps	36 Mbps	16 Mbps
960 x 720	29.97 fps	141 Mbps	94 Mbps	63 Mbps	44 Mbps	19 Mbps

1280 x 720	23.98 fps	132 Mbps	88 Mbps	59 Mbps	41 Mbps	18 Mbps
1280 x 720	25 fps	138 Mbps	92 Mbps	61 Mbps	42 Mbps	19 Mbps
1280 x 720	29.97 fps	165 Mbps	110 Mbps	73 Mbps	51 Mbps	23 Mbps
1440 x 1080	23.98 fps	226 Mbps	151 Mbps	101 Mbps	70 Mbps	31 Mbps
1440 x 1080	25 fps	236 Mbps	157 Mbps	105 Mbps	73 Mbps	32 Mbps
1440 x 1080	29.97 fps	283 Mbps	189 Mbps	126 Mbps	87 Mbps	38 Mbps
1920 x 1080	23.98 fps	264 Mbps	176 Mbps	117 Mbps	82 Mbps	36 Mbps
1920 x 1080	25 fps	275 Mbps	184 Mbps	122 Mbps	85 Mbps	38 Mbps
1920 x 1080	29.97 fps	330 Mbps	220 Mbps	147 Mbps	102 Mbps	45 Mbps
2048 x 1152	23.98 fps	302 Mbps	201 Mbps	134 Mbps	93 Mbps	41 Mbps
2048 x 1152	25 fps	315 Mbps	210 Mbps	140 Mbps	97 Mbps	43 Mbps
2048 x 1152	29.97 fps	377 Mbps	251 Mbps	168 Mbps	116 Mbps	52 Mbps