Telestream
Whitepaper

MacCaption

Switch

iTunes.

Ensuring High-Quality Video Captions and Subtitles for iTunes Delivery

How to prepare your video for iTunes delivery

Learn about Telestream Mac OSX software tools purpose-built for closed captioning and delivery to iTunes:

MacCaption for creating, editing and fixing closed captions and subtitles

Switch 2.0 for frame accurate QC inspection and verification of captioning and packaging your video for delivery to iTunes

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Introduction

With over 85,000 movies and over 300,000 TV shows, games, music video and apps just a tap away, Apple iTunes is an industry leader for streaming, downloading and acquiring media content.

To ensure an optimal viewer experience, media professionals should deliver the highest quality media assets possible. And in its iTunes Video and Audio Asset Guide, Apple spells out its technical specifications for delivering media and files for the iTunes store, including:

- Movies
- Television shows
- Music videos

Products for iTunes must meet or exceed the quality of the physical product in the marketplace as well as the highest quality television broadcast master. When received, the media files must work seamlessly within its established iTunes distribution workflow.

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The bottom line is, if the media files in the ITMP (iTunes Media Package) do not meet all of the iTunes technical delivery requirements, they will not pass and iTunes may send a rejection report to the digital content creator. The issue must then be fixed and the content resubmitted. This rejection can impact a tight production schedule and delay the availability of that content on iTunes, and potential downloads and sales by viewers.

MacCaption and Switch software can help you create, check and send high-quality, compliant video captions and subtitles that meet iTunes's technical requirements the first time, avoiding bounce backs and delays.

These Mac OSX-based tools have been engineered with both broadcast and Internet delivery in mind. Together, MacCaption and Switch enable you to inspect, troubleshoot and fix captioning problems related to your media files. And they support your entire captioning workflow to help you prepare a high-quality ITMP quickly and affordably.

What's in the ITMP wrapper?

It's critical for any digital content provider to do a full inspection of the media and caption files being delivered to iTunes. And if necessary, fix any issues or problems related to the assets in the ITMP (iTunes Media Package) prior to uploading them to iTunes.

The ITMP wrapper typically contains the following files:

- Video and audio (in the .MOV ProRes full resolution codec format)
- Closed captions (in the .SCC file format)
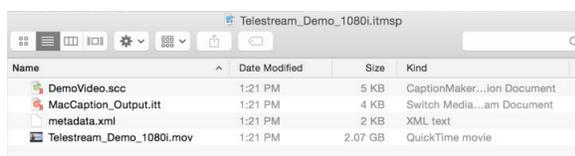- Subtitles for each foreign language (in the .iTT file format)
- Metadata.XML data

Figure 1. Example of contents of ITMP

The closed captions contained in the ITMP must be in the Scenarist Closed Caption file format (.scc). .SCC uses the same formatting as TV closed captions (CEA-608), and supports a single language with Latin alphabet characters.

iTunes Time Text (.iTT) subtitle format is intended for delivery of subtitles associated with the video content. Unlike .SCC, this format supports a variety of languages including Unicode characters sets for Asian and European alphabets. This is critical for delivery to geographical areas that do not speak the language of the media. Multiple .iTT files can be exported and attached to a single iTunes package.

The time code frame rate for the iTunes caption files can only be 29.97 frames per second, which may differ from your video source frame rate. With regards to iTunes, source video refers to the video file that you are sending to iTunes, not your broadcast and cinematic master versions.

Since iTunes requires studios to send the highest quality video source available, this may be in a 23.976 (23.98), 24, 50i, or other framerate that's independent from the captions' 29.97 framerate. In this white paper, we'll go into greater depth about how the captions must be properly synchronized to meet or exceed the iTunes requirement of text appearing within one second of the spoken dialog–even when the source video and closed caption files have inherently different frame rates.

Complying with changing legal regulations

Since Apple iTunes and content producers share the goal of offering the highest quality content and viewing experience possible, this means providing closed captions and subtitles that make the program accessible to all consumers, including those that are deaf and hard of hearing and non-native English speakers.

The law also now requires closed captioning on any Internet content that previously aired on broadcast television (Twenty-First Century Communications and Video Accessibility Act (CVAA).

There are also new FCC guidelines that require closed captions to meet a higher standard of:

- Accuracy: matching the spoken dialogue and sounds
- Synchronicity: coinciding with spoken words and sounds
- Completeness: running from the beginning to the end of the program
- Proper placement: displaying without blocking important visual information

These recent changes raise the bar on the nature and quality of video programs distributed via Internet outlets, such as iTunes. MacCaption and Switch ensure that your captioning assets meet both iTunes technical requirements as well as the latest FCC mandates.

MacCaption and Switch can help you deliver accurate, compliant captions and subtitles to broadcast TV, iTunes, and other Internet OTT media outlets.

Creating and formatting captions files

MacCaption software provides a feature-rich environment that allows you to create, edit, convert and export compliant closed captions in a streamlined manner. It exceeds the caption creation capabilities of simple subtitle editing tools. And it exports caption and subtitle files that are compatible with standard video editing systems and transcoding automation systems like Telestream Vantage.

MacCaption also has the ability to convert other kinds of caption and subtitle files to the .SCC and .iTT files you need for iTunes. For example, MacCaption can import, edit, and convert the following caption and subtitle file types:

- .MCC
- .CIN
- .TDS
- .CAP Cheetah
- .XML TTML (SMPTE 2052)*
- .VTT WEBVTT*
- .STL EBU*
- .PAC*

* Some subtitle file formats may contain non-Latin alphabet characters that cannot be converted to .SCC and would need to be converted to .iTT instead.

To extract the captions data from these various files–for conversion into the .SCC and .iTT formats required for iTunes–make sure that you are in "caption mode" and drag and drop your .SCC file or other type of file into the text area of the MacCaption user interface.

Figure 2. MacCaption User Interface

To extract subtitle data from .STL, .PAC., or iTT, make sure that you are in "subtitle mode" and drag and drop the file into the text area of the MacCaption user interface.

If caption data is embedded into a media file, MacCaption can also extract the CEA-608 or CEA-708 captions from those file formats to convert into an .SCC or .iTT file. MacCaption can extract embedded 608/708 caption data from the following file formats:

- .MXF OP1a XDCAM HD
- .MOV ProRes HD with CEA-608 or 708
- .DV (DV25/DV50)
- .MPEG-2 Transport Stream or Program Stream
- .MXF IMX 30/50 SD with VBI
- .MOV ProRes SD with VBI
- .MOV DVCPRO HD 100

Viewing and editing captions

Once your video has been edited and the captions added, it's important to check your video for any potential errors or mistimed captions. Switch is a media player that lets you double-check the captions that were created in MacCaption. If an error is discovered, you can go into MacCaption and use the editing tools to fix the problem. You would then export a new .SCC file back into Switch by importing your secondary file for a final check–and if it's all good–proceed with packaging.

One common captioning error is a misspelled word or acronym that might appear in several places throughout the program. Similar to any word processor, MacCaption can quickly find a particular word and replace it with the corrected text. This is possible because MacCaption can decode caption and subtitle data into simple, editable text. To find-and-replace text, go to Edit on the top menu and select Find. Then type the word to find and enter the word you want it to substitute.

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Another common problem is a caption or subtitle that blocks an on-screen graphic, such as a lower third or other visual information. Or perhaps the caption or subtitle is not positioned in an easily legible way when two speakers' dialogue appears on-screen at once.

In MacCaption, captions and subtitles can be positioned one by one manually or as a selected range of captions. And if a word is missing or needs to be deleted, MacCaption's Caption Cell Editing feature lets users quickly type in the missing word, or delete words, from each caption cell. MacCaption's grid positioning follows TV closed captioning standards (CEA-608) to make sure that captions and subtitles are positioned properly and compliant with government quality rules.

QC'ing your video and captions in Switch

Switch has a wide range of tools and capabilities that complement MacCaption as you prepare your video for iTunes delivery. Use Switch to:

- Spot check the integrity of the full-resolution ProRes codec video to make sure there are no compression artifacts or audio/video quality issues

- Check for proper audio configuration and mapping

- Check the synchronization of captions against the associated video

- Play the ProRes out (via a capture card) to a broadcast, waveform and/or vectorscope monitor to verify video and audio levels

- Find potential captions problems, such as missing captions or subtitles, misspellings and blocking other visual elements

Switch also has the unique ability to export all of your program's related media assets, such as the ProRes video, .SCC captions and .iTT subtitles, into an ITMP container. It verifies that each asset meets iTunes delivery requirements and provides a package that is ready for submission.

If your broadcast master already has either CEA 708 or CEA 608 closed captions embedded in the video, this data will not satisfy iTunes closed captioning requirements. When embedded captions are found in a ProRes file, MacCaption can extract this data to create the necessary .SCC or .iTT file for delivery. Switch can also read captions embedded inside a ProRes file but will still need a separate .SCC and/or .iTT to create the proper iTunes package.

Closed captions and subtitles will need to be delivered to iTunes as separate files which are also referenced in the ITMP metadata file that accompany the associated .mov source video. For this reason, they are referred to as sidecar assets.

iTunes accepts sidecar assets submitted in your ITMP and generates compressed files with embedded captions and subtitles that will be posted on the iTunes store. If the .SCC and .iTT sidecar assets are missing, your video content may be rejected due to missing captions and/or subtitles.

Since the iTunes delivery includes separate .MOV, .SCC and .iTT files, media professionals need a way to verify that:

- The master video and audio .MOV file is in the proper format

- There are no audio/video quality issues

- The timing of the text in the .SCC and .iTT files matches the .MOV video file

- The quality of the captions meets or exceeds accessibility guidelines for text formatting and positioning

Timing and sync problems are another common reason that caption files are rejected by iTunes. Current requirements can be found in detail in the iTunes specification document. Here is an excerpt:

Source Video Framerate	Caption Framerate	Description	Timecode Format	Timcode Examples
29.97, 59.94i	29.97	NTSC Video	DF	HH:MM:SS:FF
25, 50i	29.97	Pal Video	NDF	HH:MM:SS:FF
24	29.97	Film	NDF	HH:MM:SS:FF
23.976	29.97	NTSC Film	NDF	HH:MM:SS:FF

Figure 3. Chart of the current Apple iTunes media delivery requirements.

Dealing with timing and sync issues

Using Switch, you can compare the .SCC captions file– as well as the .iTT subtitles–against the ProRes video file to check for synchronization issues. Frame rate conversion is often the biggest culprit leading to timing issues where the timecode of the captions file is out of sync with the source video file.

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Recall that to meet the iTunes specification, the caption file must be 29.97 fps. (see Fig. 3) This frame rate is standard for TV broadcast video masters. However, a source video file being delivered to iTunes may have a different frame rate such as 25 fps or 23.976 fps. The video's timecode rate now no longer matches the captions timecode in the .SCC file, which must always be 29.97.

Now that the new CVAA regulation calls for broadcasters to deliver captioned shows to the Internet, more video production studios and networks are dealing with similar framerate timing problems on a regular basis. As a purpose-built solution for closed captioning, MacCaption is designed to produce captions that are correct and frame-accurate.

Once the timing adjustments have been made, a new .SCC and/or .iTT file can be exported to create an iTunes package in Switch. Here are some of the MacCaption tools that can help you adjust the timing of your caption or subtitle file:

- Timecode Ripple
- Convert Timecode
- Timecode Stretch/Shrink
- Timecode Mode

Timecode Ripple helps to correct problems that arise when the starting time of a caption document doesn't match the starting time of the ProRes video. Essentially, the first caption or subtitle would not appear at the proper time during QA in Switch.

When applying this parameter, the entire range of captions can be selected thereby setting a new starting timecode for that range. In addition, the Ripple tool can also add or subtract timing by hours, minutes, and frames to make critical adjustments. Once Timecode Ripple has been applied, the results can be verified using the Preview/Play button in the MacCaption playback mechanism.

Convert Timecode applies to situations where a caption or subtitle has a different framerate than the ProRes .MOV video file. A timecode conversion may be necessary to synchronize the timing of the two files.

This may be a critical step to take before converting a caption file or caption data to .SCC or .iTT files. The conversion mode includes a variety of options to properly calculate the desired output framerate of the caption deliverable. This step should be done only if the source caption/subtitle file doesn't match the required framerate that iTunes has in their delivery specifications.

Timecode Stretch/Shrink resolves timing issues that some caption files may exhibit during quality assurance. Typically, when the timing of a broadcast TV file doesn't match the timing of a ProRes 23.98 fps master file, the captions and subtitles will start off in sync and then slowly "drift," becoming too early or too late as the video progresses. Timing may be off by 3.6 seconds after 60 minutes.

When this "drift" occurs, MacCaption's Stretch/Shrink tool can fix this drift problem with three user-selectable options:

1. Increase time code by 1.001/1.000. Increase will stretch the timing of the selected range and add 3.6 seconds per hour to the timing.

2. Decrease will shrink the time code by 1.000/1.001. Decrease shrinks the timing of the selected range and subtracts 3.6 seconds per hour to the timing.

3. New value for last time code: [enter time code value]. The value entered for this parameter has to match where the last caption/subtitle should trigger. It is imperative to playback the video in MacCaption and pause at the exact time where the last caption/subtitle syncs with the spoken word or sound. Once applied, the timing of the captions will stretch or shrink based upon the time code value entered.
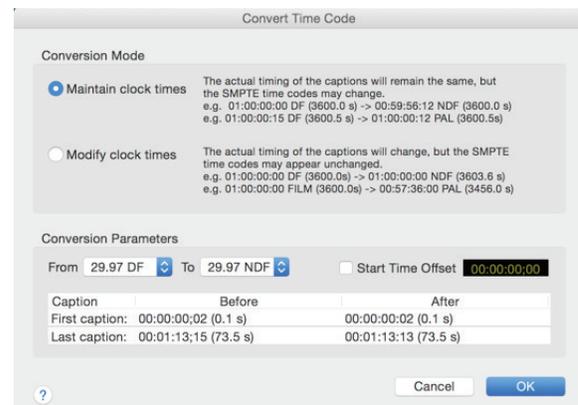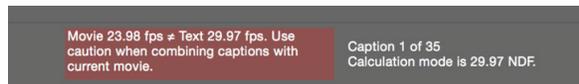

Figure 4. Convert Time Code UI in MacCaption

Timecode Mode allows users to set a global framerate for the caption/subtitle project they're working on. The timecode mode in MacCaption should be set to the desired caption/subtitle output format and not necessarily to the ProRes .MOV framerate. This is especially useful if iTunes requires a 29.97 non-drop frame (NDF) with a ProRes .MOV that is 23.98 fps.

Figure 5. MacCaption prompts users to use caution to match 29.97 fps captions with movies that have a different frame rate.

The timecode mode should be set to 29.97 NDF since the .SCC output is designed to support that framerate. When this parameter is set to 29.97 NDF, the video file will also playback at that framerate for purposes of synchronization. When the video source is 29.97 drop frame (DF), MacCaption's time code mode should be also set to 29.97 drop frame for iTunes delivery.

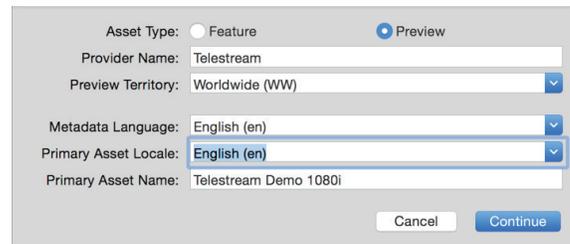## Generating the iTunes store package

After creating and editing captions with MacCaption, and performing your quality control analysis, Switch can export your ITMP file for delivery.

To add both .SCC and .iTT files to your Switch project, go to the File menu and select "Open Secondary Subtitle File". Then select either the .SCC or .iTT file you want to include in your iTunes store package.

Once the captions have been married to the video, go to Export menu or click on "Export" at the bottom of Switch's inspector window and select iTunes Store Package. Switch will then check your ProRes .mov file to make sure it is in the correct format and that the audio tracks are properly configured for the iTunes store. Next, Switch provides a way for users to specify metadata such as:

- Provider Name
- Preview Territory
- Primary Asset name

Note: Please see iTunes specifications [link] to verify the correct settings for your media.

Figure 6. Switch iTunes export metadata window

Finally, Switch will export an ITMP package containing all the necessary deliverables for iTunes. Within this package, an .XML file is generated that contains user-specified metadata and references all .mov, iTT, and .SCC assets within the package.

Figure 7. Example of XML file generated from Switch ITMP export

Becoming more efficient with your iTunes deliveries

There is growing demand for high-quality closed captions and subtitles on Internet delivered video, even when it isn't specifically mandated. While they're essential for the deaf and hard of hearing, they also benefit hearing individuals that in some instances want to watch shows with the sound off, or that don't speak the language of the media.

However, expanded regulations impacting Internet video distribution pose new barriers for digital content creators that want to deliver their products to market quickly.

With their rich toolsets and intuitive interfaces, MacCaption and Switch eliminate the technical hurdles to preparing and exporting closed captions and subtitle files to your ITMP. And they give you the security of knowing your captions are correct and compliant before you upload them to iTunes.

Download trials of Telestream products at:

MacCaption: http://www.telestream.net/controls/captioning/download-captioning.htm

Switch: http://www.telestream.net/controls/switch/download-switch.htm

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