LTCconvert Manual

(formerly known as FCPauxTC)

July 27, 2017
Version 5.0.9
Platforms: Windows and Mac

www.VideoToolShed.com

If you are too lazy to read trough this manual, start HERE

1   General remarks

1.1   Purpose

Reading Audio timecode out of Video or Audio files, and convert that to normal timecode.
Optionally it can copy or transcode the input, while doing a custom merge of audio / video.
And it can set a new timestamp on BWF to match the original TC, so you don't have to touch your video at all.

1.2   Who should use this?

Anyone who uses Audio timecode (LTC) on recording, or needs to merge video with BWF.
Examples:

- Synchronization of two cameras that do not have a Timecode input.
- Synchronization of a BWF recorder and a camera without a Timecode input.
- Shooting video clips with on-set playback. In this case, you end up with clips with a timecode that represents the exact position in the song.

1.3   What knowledge do you need to have before you use LTCconvert?

A decent understanding about timecode, framerates and BWF workflows.

1.3.1   Please read the manual before you start.

A lot of questions you might have will be answered here.
To make this manual easier to read:
on the left side of your PDF viewer there is probably a button that gives you an interactive table of contents wile scrolling. Or, enable 'bookmarks' in your PDF viewer.
If you run into trouble, do check the Errors chapter.

1.4   Demo limitations.

The (free) demo has a few limitations:
-You can use the "set timecode on sources" function just on one clip.
-If you export, your exported files will be no longer than 20 seconds.
-If you set source TC on BWF files, only 2 clips will be processed.

Beside this there is no difference between the full version and the demo.
So, before you decide to buy it, test your workflow using the demo. If the demo does not work for you, the paid version won't do that either!
But if you need help getting things to work you may always contact us.

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3   Installation

All VideoToolShed products come without an installer.

Nothing gets changed to your operating system!

3.1   Installing for Mac

Drag the entire folder to your applications folder in your Applications folder. On opening the DMG, you'll get that option.

You can make shortcuts on your desktop / toolbar if you like, just drag the application there.

DO NOT try to run the application from within the Disk Image, this will probably NOT work!

If you want to use the 'set TC on sources', Quicktime must be installed, but this is the case on almost any Mac. If you get a warning about Quicktime, download it from Apple. (It's free.)

3.2   Installing for Windows

Drag the ENTIRE folder to your harddisk. Avoid long pathnames, so you could make a Directory called 'videotoolshed' and put the application directory in there.

Right click on one of the applications, and select either 'pin to taskbar', or 'pin to Start menu'.

Alternatively, you can drag the icon to your tasktbar or start menu.

Note, f you want to use the 'set TC on sources', Quicktime must be installed,. If you don't have Quicktime, download it from the Apple site and install.

The free version is good enough.

3.3   Registration

Choose 'Register' from the file menu. A new window opens. If you have bought the program, vou've got a mail with a serial number. Copy / paste the serial number in the Register window, and press 'done'. Transcriber will now run for as long as you like.

3.4   Uninstalling

Just delete the entire application folder. That's it!

4   Introduction

This application can read audio timecode from QT, MXF, AVCHD and Wave / BWF files and add a Quicktime Timecode track / BWF timestamp for use in Final Cut Pro / Premiere, Avid, or any other application that works with Quicktime / BWF.

It can also transcode to Prores, with the audio timecode converted to Quicktime timecode.

Optionally it can add BWF files with matching timecode.

It also can analyze the audio timecode from video, compare that with the BWF audio, and then create new BWF files so they correspond with the normal timecode on your video. (It's smart enough to also do the BWF files that are recorded without video.)

4.1   Before you start

Make sure your settings are correct for the file you are going to open.

Under 'Setup' and 'Input' in the menubar you'll find different options.

Set them to your liking. More on that is found in the

4.2   Getting started

Start with loading just one file, using the 'pick single file' button, or drop just a few items onto the application. (You can drop files / folders, and both video and audio at the same time.)

Note: the application expects just one video filetype as input per drag / drop operation.

So if you drop a mix of Mp4, MXF and BWF files, only the MXF and BWF get imported!

- Set the application to the correct FPS
- Set the application on what channel the LTC is to be expected
- Hit 'Scan all clips'

The application should now find LTC, and in case BWF files are also loaded, it will show you matching pairs as well as the BWF clips that have no relation to video. (If any.)

Then decide if you want to set the TC on the sources (Only possible if input is QT), create new clips, or want the existing BWF timestamps to match the source video TC.

5   The menu interface

On Windows, the Menu is on the top of the LTCconvert window. On Mac, the File menu is on top of your screen, if LTCconvert is the active application. (Click on it to make it the active application.)

5.1   Menu 'file'

• Register

Choose this if you have bought a licence. A new window opens. You've got a mail with a serial number. Copy / paste the serial number in the Register window, and press 'done'. Transcriber will now run for as long as you like.

• Export report as Excel

This will give you an Excel report of found timecodes / matching BWF files.

• Quit

To quit the application and save your current settings.

5.2   Menu 'Setup'

• **Work on Video / Work on Wave**

Choose if the files you work on are video or wave files

NOTE: if you set it to Wave, it expects Wave files with an Audio Timecode track.

This is NOT to be confused with Wave files that already have a timestamp matching the LTC noise on your video. This is if you have a Wave audio recorder that has gotten an LTC signal on one of the inputs.

• **Set BWF matching options**

A new window opens where you can set 2 things:

On top is a checkbox. If you enable this, and you have more than one BWF (mono or poly) matching the video, only the longest will be used. You normally do NOT want this, as it might happen that the sound recordist did a stop/start during a take. But in case you don't run FreeRun TC, you might want this.

The BWF file with the longest overlap will be used.

Next there is a field where you can fill in the amount of overlap the video and sound must have to be concidered a match. A value of 1 normally works fine. (But in special cases you might want to set it higher.)

Setting it to 0 is an option, even very short overlaps will be included.

• **Set the desired FPS.**

Pal: 25 FPS, (normal use in the Pal part of the world.)

NTSC df / ndf: 29.97 FPS (normal use in the NTSC part of the world)

30: only for VERY specific cases!

24: for FILM work, almost never used in the normal video industry.

23.976: for broadcast / video work sometimes named 24P. Note that FCP calls this 23.98! Don't worry, it's the same thing.

• **Use THM or EXIF.**

Check this if you have shot with a DSLR, and want to be able to 'guess' the TC for clips that accidently have no Audio TC. Leave it UNCHECKED for other file types.

• **Set LTC scanduration.**

If you select this, a new window will open. Set the amount of seconds you want the application to search into the files. (Eg. If you have send a small burst of LTC and then switch back to normal sound.)

Higher values will take longer to process if LTC is not at the beginning, or is not present at all.

It has a minimum of 2 seconds, no maximum.

- **Display waveform:**

Check this to enable the waveform. This slows down the process of LTC reading a tiny bit,

but it is very handy to troubleshoot and set up the application!

(and if you have a client looking over your shoulder, it looks nice :-)

- **Reset all settings to factory default**

Will reset all settings to factory default.

5.3   Menu 'Error correction'

- **Guess TC when nothing is found:**

If you enable this, and you have a couple of clips with readable timecode, and a couple without, the application will guess the new timecode for the un-decodable clips based on either the original timecode or Exif/THM. (of course you must have shot TOD.)

It assumes that files in the same folder are from the same shooting day.

Clips that have 'guessed' timecode will be marked as such, so you can pick them out to check.

- **Calculate BWF match based on LTC fps:**

If you enable this, the timing will be done based on the FPS found in the LTC, no matter the FPS set in the Setup menu. If you disable this, the math will be done based on the FPS you have set. Normally you have both BWF and LTC speed the same, but in case of a mismatch, this might save your hiney.

If there is a mismatch, DISABLE this, set the FPS to the BWF speed, load clips and try again.

If the Setup FPS matches the BWF FPS as well as the video's LTC FPS, it does not matter.

- **Offset:**

If you know there is a fixed offset for the timecode (it might be your video went trough a lot of equipment causing a delay), you can compensate for that. (Some DSLR's have out of sync sound, you might want to test a bit to get it right.)

If the offset is REALLY HUGE (that might have to do with Pre-roll on some sound recorders),

or you have another custom need, you can specify a custom offset yourself.

The value to enter is in frames / partial frames (so you can input -11.2 to have a negative offset of slightly more than 11 frames.)

Note, if you are using Audio timecode, you MUST use 'Scan for (audio) Timecode after using this function.

If you want to merge on Existing TC, the offset will be used as well!

It does NOT alter the TC if you export to a new file, but it will alter the timing for sound.

However, for the 'Set found TC on sources', it will be used.

(Both for Wave/BWF and QuickTime.)

Note, for Quicktime, there might be a frame difference than you expect. It takes the EXACT time from the LTC, and that might have a small offset compared to the video TC. (Audio does have a very high framerate.)

Trust it, it's highly accurate.

5.4   Menu 'Render To'

Only needed if you want to transcode / merge with BWF.

If you want to set TC on sources, or set a new timestamp on BWF, this is irrelevant.

- **Codec:**

Pick your codec

You can choose between 4 flavours of ProRes, or 'Copy, no transcode'

If you use Prores, the output will always be QuickTime (.mov)

If you have chosen 'Copy, no transcode' , it will keep the codec, and will be very fast since no transcoding is done on the video. Depending on the 'export MXF instead of Mov' checkbox, output will be Mov or MXF.

MXF is generally only an option when the source is also MXF.

- **Output multiple mono**

If checked, the output file will have one audio TRACK per audio CHANNEL as you have patched. If unchecked, the output will have just one audio TRACK, that has all the channels as you have patched.

This is a bit difficult to understand. See it as Mono vs Poly BWF files. If unsure, keep it unchecked.

(Premiere wants files as one track with multiple channels. If you open a file in VLC with multiple tracks, only the first one will play by default, you need to tell VLC if you want to listen to another track.)

- **Set output subfolder options:**

This will define if the original folder structure is rebuild in the output folder, or the new files end up in a specific subfolder, or all end up in the root of the output folder.

Choosing this opens the same window as clicking on the 'Set folder depth' button in the main interface.

See here for more information.

- **Cores:**

Pick the amount of cores you want to use for the transcode. More is faster, but you might not be able to use your computer for other tasks.

Do not set it higher than the amount of cores you have, it won't work.

If you have choosen 'Copy, no transcode' , it does not really matter, you can set it to 1.

5.5   Menu 'Special options'

These options only work in combination with 'copy QT or Wave with new TC', and 'Set found TC on sources'

- **Remove all existing QT Normal TC tracks**

Enabling this will remove / not include QT tc tracks without a flag, or with a 'normal' flag.

NOTE, a new QT TC track based on LTC WILL be added! You normally want this ON.

- **Remove all existing AUX TC tracks**

Enabling this will remove / not include QT tc tracks with an 'AUX' flag.

NOTE, Only FCP 7 and VideoToolshed software know about the differences between the QT TC 'normal' and 'aux' flags. Other applications just read the first TC track they find.

You normally want this ON.

- **Flag normal / aux for FCP**

Will set the 'normal' / 'aux' flags on existing and new to add QT tc tracks.

Note, this is a bit obsolete. Besides FCP 7, and VideoToolShed software, there are no known applications that will see the difference between 'normal' and 'aux' QT TC tracks.!

You normally want to leave this OFF.

- **Put AuxTC on top**

Places the new generated QT TC track (created from the audio TC) as first TC track in the QT, so 'some' applications will read that instead of the original TC.

This is for very special circomstances and you probably don't have to worry about it.

5.6   Menu 'Help'

- **Open Help**

Shows this manual

- **About**

Shows the version you are running,

6   The graphical interface when in 'Work on video' mode

On top you see a lot of buttons and checkboxes.

In the middle there are two lines that give you feedback on what is happening.

In the bottom there are thee columns. They show you

- loaded Source files
- loaded BWF files
- matching pairs

If you do not have BWF files, or work on Wave files with LTC, only the first row will be used.

6.1   Graphical interface, top left buttons

- **Button 'Pick source folder'**

Choose a directory, all clips in there will be added to the list for batch processing.

If you also enable the "include subfolders" checkbox, all directories inside the location you've picked will be added as well. (This goes for dragging in entire folders as well.)

- **Button 'Pick single file'**

Handy to test, or if you indeed need just a single file

- **Button 'Clear list'**

Clears out the current loaded files.

(If you're done on one file / directory and want to process another.)

- **Button 'Pick BWF folder'**

(Optional) Select the folder containing the BWF files that should match the video.

Note, subfolders will be included as well.

The center column will show the BWF files,

the right column will show you the video files with their matching BWF files.

- **Checkbox 'Userbits must match'**

Check this if you have set Userbits in your BWF as well as in your LTC track, and want to marry audio / video from multiple shooting days. If this is enabled, the 'matching pairs' will show only matches when there is both overlap of audio / video, AND the shooting day (defined in the Userbits) is matching. In other situations you probably want this Unchecked.

- **Button 'Scan all clips'**

Will start the (batch) reading of all currently loaded clips.

In the displayed list, the found timecode will be added next to the clip name.

If the application was unable to decode timecode, no TC will be displayed.

6.2   Graphical interface, Output settings

- **Textfield 'Reelname':**

Fill in a custom reelname to be included in the QT TC track.

Or, you can use folder and / or filename as a Reelname.

Note: When toying with this, have at least one clip loaded to see what happens!

- **Checkbox 'Reelname from specific folder'**

To use a folder in the source path as Reelname.

If you want to use a specific folder, you can set the depth:

- **Button 'set Folder Depth'**

This opens a new window, where you can set if you want the output to be in the exact same folder structure, and you can set the specific folder to use as Reelname

- **Checkbox 'Keep exact folder strucure on output'**

Enable this if you want to keep the exact folder / subfolder structure on output.

- **Textfield 'Folder depth for Reelname'**

Fill in a number to get the specific folder you want as reelname. The logic behind this:

For a lot of file formats, the name the clip lives in is not the name you want.

Eg, a Sony A7s has clips living in:

        ...\PRIVATE\M4ROOT\CLIP

You have probably offloaded them to

        MediaDrive\ClientName\Day_01\Card_01

So the full pathname is

        MediaDrive\ClientName\Day_01_Card_01\PRIVATE\M4ROOT\CLIP\C0001.MP4

You probably want to copy these files to a new folder called 'Day_01_Card_01'

And you want the Reelname to be the same.

Set the depth of the folder to 4

(Count back the folders, 1 = \Clip, 2 = \M4ROOT, 3 = \PRIVATE, 4 = \Day_01_Card_01)

Click Done to return to the main interface.

For Reelname, You can use both (specific) folder and clipname you like.

- **Checkbox 'Reelname from Clipname'**

Enable this, and the Clipname will be added.

All this works for both Output option A as well as Output option B.

(Of course if you set TC on sources, the 'keep exact folder structure on output' checkbox is always effective.)

6.3   Graphical interface, Output option A

If your sources are Quicktime, and you don't want to marry BWF, you can set the found LTC TC as a new Quicktime TC track.

NOTE, this is DESTRUCTIVE.

If you have it set to delete original timecode tracks, these timecode tracks will be lost forever! So, only use this if you have really tested everything, or if you have a good backup.

The "Reelname" field (just under the checkboxes) can be used to set the Reelname for the new QT tc track.

6.4   Graphical interface, output option B

- **Button 'set audio patching'**

This will take you to a page where you can set the patching of your sound.

if you choose to Export & merge BWF, you first need to set how the sound ends up in your output.
Note, even if you do not have BWF files but do want to export, you need to work on this!
You probably do not want the Audio TC noise end up in your output. Here you can disable it.
It will bring you to another page.
The list there shows the output channels. Start from the top, press the button next to Output track X.
You get a list with 8 video and 8 BWF tracks.
Select what input goes to what output, Video1 means the first soundtrack of the source video.
BWF1 means the first BWF track. If you have mono or poly does not matter, the application is smart enough to figure that out.
Below the list you'll see how the application interprets your files. (If you have loaded files.)
If you choose Omit, that track and all higher tracks will not be included in the output.
NOTE, It's possible to have non-exisiting BWF files.
This means: silence will be inserted if the audio recorder did not run for that take.
And, you can have BWF files that have a stop / start. (If sound has stopped during a video take.)
Press 'done' when you're satisfied.

- **Button 'Export (& merge BWF)'**

This will start the re-wrap or transcode of your files, conform your settings.

A 'stop render' button will appear to quit the process if needed. (Note that the clip currently in progress needs to finish first.)

- **Checkbox 'Use normal TC, not AUX'**

If you check this, the syncing will be done based on the existing timecode instead of the found audio timecode. Enable this if you already have matching TC on your source video, and just want to marry the video with BWF files.

- **Checkbox 'Move No Match BWF files to subfolder'**

Enable this to keep track of sound files that have no relation with video.
(Thus, sound recordings while the video cam was not running)
If you choose 'Export (and merge BWF)' and this option is on, sound that is not related to video will be moved into a subfolder, making it easier to manage things. (Eg find back audio only clips.)

- **Checkbox 'Export MXF instead of Mov'**

If you enable this, the output will be in an Op1a MXF container. This will not work for all codecs. In general, only enable this if your sources are MXF already.

6.5   Graphical interface, output option C

- **Button 'Set new Timestamp on BWF'**

When you hit this, the BWF timestamp will be set to match the normal timecode of your video.

This is a very fast way if you intend to sync in your NLE. LTC convert finds the difference between the normal TC and the found LTC, and will deduct / add that difference to the BWF timestamp. This is highly accurate.

Note, the original BWF timestamp is preserved in the BWF inside a new chunk in the file. So if you are not satisfied with the offset, or something else is wrong, you can always re-do it, as:

LTCconvert will **ALWAYS** read the original recorded timestamp.

Other applications will **ALWAYS** read the new set timestamp.

- **Checkbox 'Also alter No Match files'**

If you enable this, files without a match with video will also be given the same offset. This makes it more logical to find your audio. (Soundguy will tell you that some ambient sound was recorded after the interview, you know the TC of the interview, so with a shifted BWF timestamp, the ambient sound has a more logical timestamp.)

(The application assumes both camera and sound recorder have ran in Freerun.)

- **Checkbox 'Move No Match BWF files to subfolder'**

Enable this to keep track of sound files that have no relation with video.

(Thus, sound recordings while the video cam was not running)

When you set a new timestamp on BWF, and this option is on, sound that is not related to video will be moved into subfolder, making it easier to manage things. (Eg find back audio only clips.)

7   The graphical interface when you've choosen 'work on Wave'.

In this mode, the application expects Wave files as input, with a channel filled with Audio timecode.

This files can be mono group files, or poly.

You do NOT need this page if you have 'normal' BWF files with a timestamp. The goal here is to convert Wave files with audio timecode to proper BWF files, or Qucktime (audio only) files with Quicktime timecode.

7.1   Step 1, Pick / analyze input, Graphical interface 'work on Wave / BWF'

- **Pick source folder**

Choose a directory, all Wave in there will be added to the list for batch processing.

If you also enable the "include subfolders" checkbox, all directories inside the location you've picked will be added as well.

- **Pick single file**

Handy to test, or if you indeed need just a single file

- **Clear input list**

Clears out the current batchlist.

(If you're done on one file / directory and want to process another.)

7.2   Step 2, set option (Mono / or Poly)

If you have multiple Wave files that belong together, like Mono BWF, or two stereo files out of a Zoom recorder, you need to tell LTCconvert how to handle that.

If you have Poly files (Meaning, one file with multiple tracks), you can leave these fields blank.

If you set everthing right, LTCconvert will know what files belong together.

7.2.1   Text field: 'scan LTC only for files ending on:'

Fill in a wildcard:

Eg, A sound devices / WaveAgent Mono clip will look like:

Recording_1.wav
Recording_2.wav
Recording_3.wav

Now if your LTC is on channel 3, enter   '3.wav' or '_3.wav'
Do set the menu 'Input' to 'channel 1/2', as since this is the only file to be checked!

7.2.2   Text field: 'Mono files delimter / seperator:'

Set the 'mono files delimiter / seperator' to the char / string that comes straight after the 'clean' name.

In our (SoundDevices) case, this will be an underscore ('_')

If you do so, the application knows what files belong to each other, and they will be merged / get the same timestamp.

For Poly files you can leave these fields blank, and set the input to the desired channels.

For files coming from the old Zoom recorders:

the 4 channels live in two stereo files.

Example

First clip consists of:

4CH001l.wav

4CH001M.wav

Now, if your LTC lives on channel 4, this is in the M files.

- Set the text field 'scan LTC only on files ending on' to 'M.wav'
- And, set the Input channel to channel 1\2 (as this is the only file to be scanned)
- Leave the text field 'mono files delimiter / seperator' EMPTY

For files coming form the new Zoom recorders, it might look like this:

ZOOM0004_LR.WAV

ZOOM0004_Tr1.WAV

ZOOM0004_Tr2.WAV

ZOOM0004_Tr3.WAV

ZOOM0004_Tr4.WAV

Now, if your LTC lives in the _Tr3.wav:

- Set the text field 'scan LTC only on files ending on' to 'Tr3 .wav'
- And, set the Input channel to channel 1\2 (as this is the only file to be scanned)
- Set the the text field 'mono files delimiter / seperator' to '_ ' (Underscore)

- **Button 'Scan all clips'**

Will start the (batch) reading of all currently loaded clips.

In the displayed list, the found timecode will be added next to the clip name.

If the application was unable to decode timecode, no TC will be displayed.

7.3   Output, Graphical interface 'work on Wave / BWF'

- **Button 'Set Found TC on sources'**

a BWF timestamp will be added to your Wave files.

Or, if the source already was BWF, the timestamp will be changed to the new found value.

8 Accuracy of LTC reading, merging and setting timstamps

8.1 LTC reading accuracy

LTC is bits in an audio signal. A timecode frame is encoded in a 'train' of bits with the duration of exact one frame. Now this train has a start that is very clearly indicated.

So, if you have LTC output from your BWF recorder recorded on your camera, and you are NOT genlocked, chances are huge that the start of an LTC frame does not match the start of a video frame, resulting in a small offset if no measures are taken.

But this is compensated for. LTC convert will assume that the video starts at an exact whole frame, and it will find the offset of the found LTC value up to 1/1000 of a second accurate, since it knows exactly where an LTC frame starts.

On copying to a new file, it will merge the BWF as accurate as 1/1000 of a second.

On setting a new timstamp on BWF, it will also be 1/1000 of a second accurate.

8.2 BWF timestamp accuracy

As you probably know, a BWF timestamp is NOT a TC, but is represented in samples.

This means, if you are in 24 FPS:

A TC of 00:00:01:00 (one second) will have a BWF timestamp of 48000 (If the file was recorded in 48K)

This means that the timestamp of one frame, 00:00:00:01 is 48000 / 24 = 2000

So, it's possible to set a clip on a video timeline as accurate as 1/2000 of a frame!

Now, if you have recorded without genlock, most of the time the new timstamp is not an exact round frame. (Since LTCconvert reads the LTC position accurate up to a couple of samples.)

Some NLE's understand this, and will position the BWF subframe accurate.

Note: if you re-process these BWF files with LTC convert, all audio data is first restored, and the original timestamp is used again.

8.3 Slowly getting out of sync

If you do not have genlock, each device will run at it's own clock.

For the start of the file, that's not really a problem, since normally all devices go into record within a few seconds of each other. Any drift happening in that period will be unnoticable.

But during a very long take, there might be a drift. This should not be more than 3 frames per hour though.

If it is more, there might be a bug / feature in your NLE that does something with pull-up / pull down or alike.

(Or you have a horrible clock in your equipment.)

But, having the sound even 3 frames off is too much to my liking. So if you shoot without any genlock, keep your takes shorter than about 20 minutes. Even if that means that sometimes you have to stop / start during an interview.

(Only the device receiving the LTC needs to do a stop / start, the LTC sending device can keep running of course.)

9 Workflows, simplified.

9.1 Dual system sound with a BWF recorder that supports Timecode.

Most of the time the sound recorder will be the master TC clock.

You take the TC output and feed it to one of your audio inputs of the camera, either by wire, or wireless.

(Any audio transmitter will do, but you can get dedicated TC transmitters.)

Steps to take in LTCconvert:

- Setup LTCconvert, make sure it's set to 'work on video'.
- Pick the video files, either just one to test, or an entire folder. (Drag / drop is also supported)
- Pick the BWF files. (Drag / drop is also supported.)
- Press 'Scan for (audio) Timecode. LTCconvert will find the Audio Timecodes for each clip.

Note: Use just ONE shooting day, as TC / BWF timestamps might overlap each other!

Now you have to decide how to synchronize the clips.

9.1.1 You sync in LTCconvert. For that, you need Output option B

In the 'render to' menu item, choose if you want to transcode or leave the video what it is, and just create a new QuickTime file with the new audio.

Next step is to set the audio patching, to decide what channel goes where. You proably want to remove the LTC track, perhaps even all audio tracks on the video, and insert the BWF tracks.

Then, press 'Export & merge BWF'.

You'll end up with new Quicktime files, with the corresponding BWF files in sync.

9.1.2 You sync in your editing software. For that, all three output options can work.

- If your video is Quicktime, you could use **Output option A**, 'Set Found TC on sources'
- If your video is NOT quicktime, you could use **Output option B**, and create new Quicktime or MXF clips with 'export and merge BWF' (If there are no BWF files loaded, the video is copied / converted with new TC). Do set your patching. It's possible to leave out the LTC channel in the output file, and / or remove unwanted tracks.
- If you do not want to touch your video at all, you could use **Output option C**, modify the BWF timestamps so they match the normal Timecode of the video. Workflow for Adobe Premiere is here.

9.2 Syncing multiple cameras

You need a LTC generator. You can use an expensive, dedicated black box, but there are also Iphone and Android applications that do the same thing.

(Google for Jumpstart or LTCgenerator.) Of course they are not very accurate, but if you start the cams at about the same time, that does not matter at all, as long as they all get the TC from the same source.

Or, if one of your cams is a Pro cam with TC out, you could use that as a master TC generator.

In any case, feed the TC signal to all your cams.

Import all footage, press 'scan for audio TC'.

Use either Output option A or Output option B.

If you choose Output option B, even if you do not have BWF's loaded, a new clip with the LTC as Quicktime TC will be generated.

9.3　Using a Zoom, Marantz or other recorder that does not have a TC generator.

Put LTC on a spare track of your audio recorder. This can come from any source.

Swith LTC convert to 'work on Wave or BWF'

Let it scan, and promote your clips to true BWF files with the correct timestamp.

9.4　Making video clips

A common way of making video clips is to have a boombox on set, and have the musicians / dancers playback / dance to the song.

In order to find back the part of the song a shot was taken, it's very handy to use LTC.

To do so:

- Make a new file of the song: on left the song, on right a LTC track. (LTCconvert comes with 10 minutes of LTC for each FPS, starting at 01:00:00:00.)

- On set, play back the song, or part of it, make sure that you only amplify the left channel.

- Take the right channel with the LTC to the camera.

- Use LTC convert to give all clips their new TC.

In post-production, you now have a very easy job putting clips in the timeline where they belong, or create multicam sequences, depending on how you like to work.

It's probably a good idea to make multiple sound files, this makes it easier to select specific parts in the song, especially if you have scripted / storyboarded your piece. This way you don't loose time finding specific spots, and you don't wear out your talent by having them to perform the entire song over and over again.

10 Syncing in Adobe Premiere

If there is TC on the video, the easiest / fastest way to work is to alter the BWF timestamps.

The BWF timestamps now correspond with the Source video Timecode

Create a new bin in Premiere and import both audio and video in there.

(Probably you make a bin per shooting day and per camera)

Select all clips, and (mouse) right click.

Select: Create Multi-camera Source Sequence.

A dialogue pops up, set it accordingly this image:
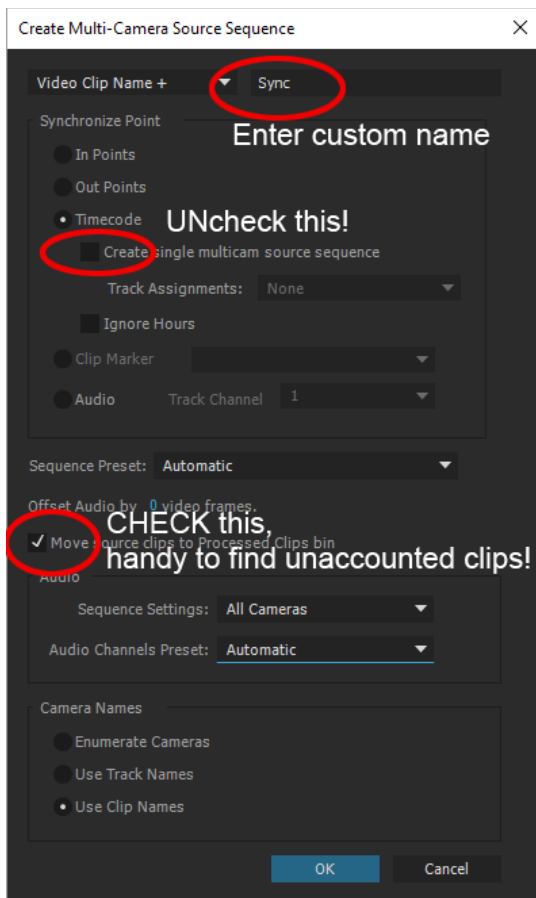
Uncheck the 'create single multicam source sequence'.

By unchecking, you'll create a synced clip for each video. Exactly what you want.

Also, Check the 'move source clips to Processed Clips bin'

This way, all unaccounted clips (either sound with no video, or video with no sound) will remain in the bin, together with your freshly generated synced clips.

Now it's up to the audio mapping settings how your synced clips will look like.

You can merge all, omit the sound that comes with the video, or have all discrete tracks.

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11 Errors / trouble

In case you run into trouble, first things to check:

Do NOT try alter timecode on files living on a network drive!
There is a bug in QuickTime that might render your files useless!
So, test first if you still want to try this!

11.1 The application will not start or behaves strange.

On Mac, if your language is set to Russian, the apllication might not start. Switch to another language to fix this.

Make sure you run the application with Admin rights. The application needs Read / Write permissions in it's own folder, and subfolder.

(Right click on the folder and choose 'properties', it should be set to Read and Write.)

## 11.2 If opening / scanning / exporting of files does not work

This might fail if the input files have very long names (> 255 characters). This might also fail if the filename, or any folder in the pathname, contains special characters. (Like ë, ç, (,),¿, /, \, etc.)

11.3 If you can't read audio timecode

First thing to do is to [turn on the waveform in the Setup menu.](#)

Have a look at the waveform. It should be a blockwave. If it's not, you're either have choosen the wrong channel, or you have another problem.

This is how it should look like:
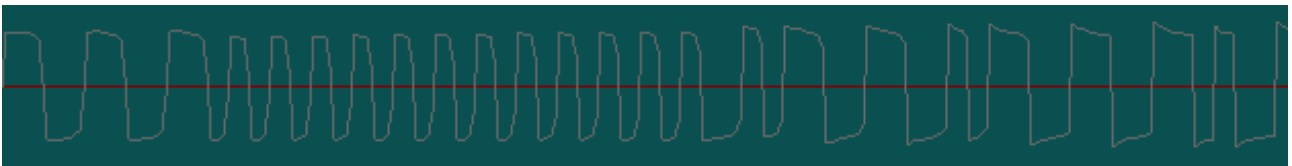
If the waveform displays a sawtooth type signal, or small peaks up/down, you have a hardware problem!
Here is an example of a sawtooth, something you do NOT want!
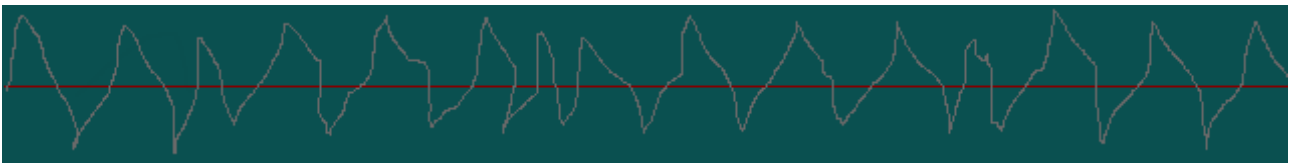
11.3.1 Do NOT record the timecode at a too low level.

Too loud is normally not a problem, as you cannot over-modulate LTC, since it's a block wave already. However cross-talk might be a problem, and you could perhaps damage your equipment.
Recording at a very low level may cause trouble.
The level itself does not matter, as long as it is not too low.
Somewhere between -30 and -15 (digital scale) is a good starting point.

11.3.2   Check your cabling / attenuation

Don't think you can put a pro-level TC signal straight into a mic input without altering the levels.

Make sure the Tc output and (camera) input levels match.

(Sometimes a simple cable with a resistor inside does the trick.)

If you can, listen to the recording and check if it sounds like the original signal.

If you have hum, or a way other pitch, something is wrong!

11.4   You have a really big offset between BWF and found audio timecode

Check the preroll function on your BWF recorder.

Preroll means the function where the recorder keeps the sound BEFORE you hit the record button.

On some recorders, this will cause a mismatch between the BWF timestamp and the LTC output of the recorder!

This can however be counteracted by setting a custom offset.

11.5   f you think you have processed the files, but you can't see the new timecode on the files:

If you are using QT player, make sure the display of timecode is enabled.

In the QT player preferences, check "display timecode when available".

If that does not help, you probably have added a new QT tc track, but the old ones are still there.

This can happen if there already was a QT tc track, but also if you process the files more than once without deleting previous tracks.

QT player, and most other applications, only see the first track.

But even if there is just one TC track, some applications refuse to see if it is flagged as "AUX".

Solution is easy, process again and check the 'delete existing TC' menu items.

11.6   If you don't see what you expected in Premiere

If Premiere 'knows' a clip (meaning, if you have opened a clip in Premiere), it might not update the bin if you alter the clip afterwards. This goes for timecode and amount of audio channels.

Try renaming the clip and re-import it.

11.7   If you don't see Timecode in FCP X

FCP X MUST HAVE a Reelname in the QT TC track, or it will not show the TC at all!

So, make sure you either tick one of the checkboxes, or fill in something in the Reelname field.

11.8   If you don't see what you expected in your OS.

There is something funny about QT.

Sometimes QT seems to have a 'memory' for files. If you put a clip in the trashcan, and put a new clip with the same name in the original location, sometimes QT plays the clip in the trashcan rather than the fresh clip.

So if things do not appear to be right, start by emptying your trashcan.

Sometimes the OS is complaining that files are ' in use', even when you are sure they are not.

Solution can be to open QTplayer (just the player, do not open a clip) and quit it.

Or, try renaming the output file(s) to something else.

If that does not 'cures' things, it's time for a restart of your system.

11.9 FCP 7 or lower and BWF.

There is a HUGE BUG in FCP!

If you change settings, you MUST restart FCP and then import the BWF's

Otherwise the displayed TC / playback speed / duration will NOT be what you expect.

Do note that BWF does NOT contain 'timecode', but a 'time stamp'

This means that depending on the setup of your system, the timecode will be calculated from the time stamp, and that can differ without being incorrect.

11.10   Premiere and BWF.

Old versions of Premiere were a mess. It works or it does not work, without any reason.

Google on it for the latest updates.

Latest Premiere versions should have no issues.

12 Appendix A, Timecodes explained

12.1 AUX TC explained

The term AUX TC is short for Auxiliary Time Code.

This means, a second timecode track next to the 'main' timecode.

The AUX TC can have many forms, the term does not say anything on HOW it is stored, only that it is an Extra or Other timecode track.

So don't get confused by this, the term is used for many different things!

In our case, it refers to Audio Timecode as well as the decoded audio timecode converted to a (second) Quicktime Timecode track.

Another term used for Audio Timecode is LTC

This means Longitudinal Time Code, meaning it's just an audio signal, funny beeps that carry the TC information.

So, if you have recorded this on an audio channel, this is AuxTC, a second TC signal next to the camera generated TC.

12.2 Final Cut Pro 7

Unlike most applications, Final Cut Pro 7 can distinguish 3 different Quicktime Timecodes: Normal, Aux1 and Aux2, Most of the time, you will work with Normal TC.

If a clip has AUX TC, you can show it in the bin, but also work with it as if it was normal TC.
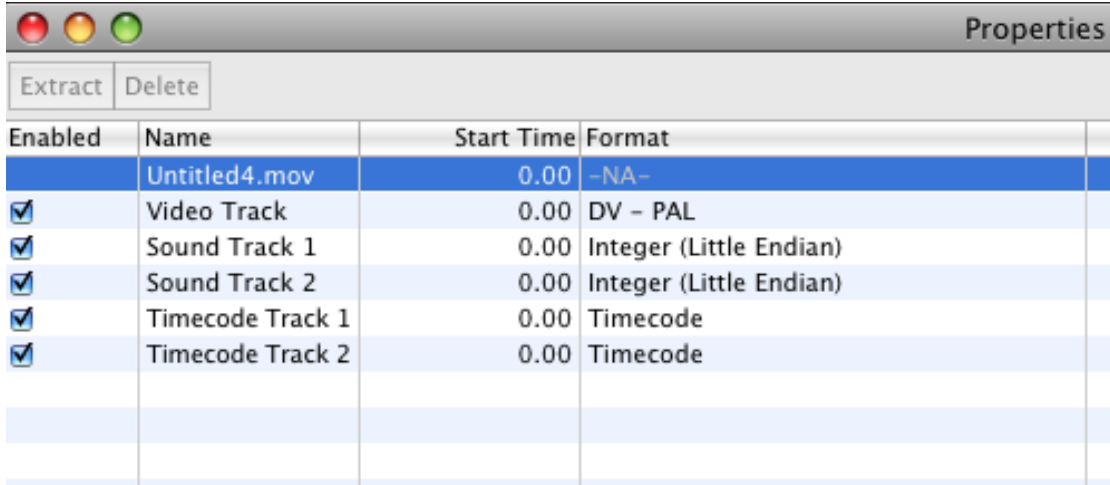
To do so, right click the top left corner of the viewer, and if the clip has an AUX TC track, you can select it.
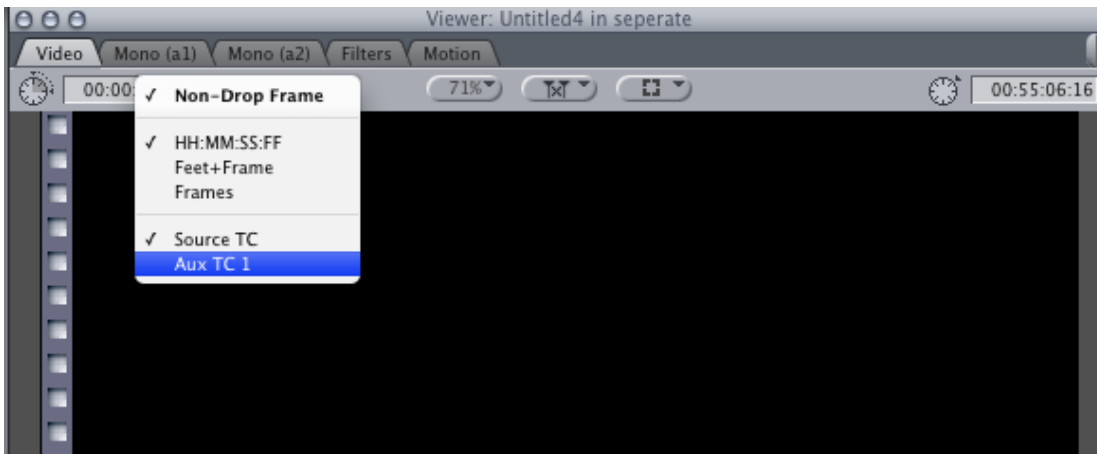
12.3 QuickTime

QuickTime is a container format. You can put virtually anything in it.
Same goes for QuickTime TC tracks, you can have tons if you want.
But, not all software supports that. Most software will just read the first TC track it finds.
You can see how many QT TC tracks there are in a clip using QTplayer.
To do so, open a clip and hit CMD-J (to open the clip properties)

In this example, we have Source and Aux TC

Enabled	Name	Start Time	Format
	Untitled4.mov	0.00	–NA–
☑	Video Track	0.00	DV – PAL
☑	Sound Track 1	0.00	Integer (Little Endian)
☑	Sound Track 2	0.00	Integer (Little Endian)
☑	Timecode Track 1	0.00	Timecode
☑	Timecode Track 2	0.00	Timecode