

Film-O-Sync 2.0



User Manual

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What is Film-O-Sync?

Like Synkino, Film-O-Sync is used to make a projector master-capable so that it can control a digital audio signal. It was originally created by Zach Poff and the old version is still available for download on his website. However, he discontinued this project in 2014 and made it available as “open source.” Film-O-Sync was originally created for MacOS.

Since a lot of weaknesses and bugs came up during my tests, I took a look at the software, fixed these things, and adapted it to my needs, so to speak. However, Film-O-Sync 2.0 now only runs on Windows 10 or higher. There is a German and an English version. I made a few changes to the original front end. I focused more on the range of functions, accuracy, and stability. Depending on your requirements, there are now two different versions: Lite and Pro. I will show you the differences in the next chapter.

Since the platform on which Film-O-Sync is based requires a paid subscription and only offers a single trial month, there will likely be no newer versions. Any requests cannot be implemented in the future. It is also still necessary to start the audio signal manually.

Film-O-Sync uses pulses to determine the speed of the projector and adjusts the digitally played audio file accordingly. It works with both Super 8 and 16mm.

Depending on the projector model, minor modifications may be necessary. I explain how I did this with my Bauer 16mm models a little further down. Zach Poff shows on his website (<https://zachpoff.com/wp-content/uploads/Sync-Digital-Sound-to-Your-16mm-Film-Projector.pdf>) how he implemented this inside his Elmo 16 CL. The necessary materials cost less than 10 euros.



All of the downloads mentioned can be found on my website at the bottom of the page (sorry, but the site is in German only):

<https://super8-welt.de/wissenswertes/film-o-sync-digitale-zweibandmoeglichkeit-per-software/>

What versions are available and what are the differences?

Since everyone has different requirements, I decided on two basic versions: Lite and Pro. Each has its advantages and disadvantages. You can decide for yourself which version is right for you. Visually, they differ only slightly. The differences lie mainly in how they work in the background.

Both are available in German and English versions.

Both Lite and Pro have built-in pitch correction, which prevents the sound from sounding lower or higher than you are used to. For example, if you have a DVD as digital audio that runs at 25 frames per second, the difference to a projector running at 24 frames per second is 4%. That may not sound like much at first, but musically it is a semitone difference. This is compensated for by the pitch correction. However, there may sometimes be situations where you don't need it. That's why there are versions with and without pitch correction. Without it, however, you may hear audible warbling.

On the control screen of both versions, you will find a built-in cinema gong, which you can play either by clicking on it or by pressing the number 9.

Film-O-Sync 2.0 Lite



For those who “only” work with stereo files anyway and want software that is as easy to use as possible, there is the Lite version.

This includes all the functions you need for stereo synchronization. However, it does not have a so-called downmix of multichannel files. I will explain how this works later.

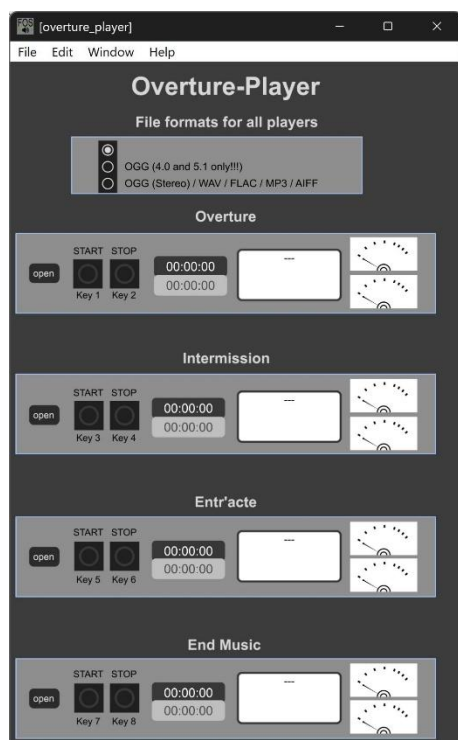
Film-O-Sync 2.0 Pro



But if you're as crazy as I am and want the best possible playback in 4.0 or 5.1, go for the **Pro** version.

To make this possible, a completely new playback path was necessary in the background.

However, in order to take advantage of the full functionality, there are a few things that **must** be taken into account, especially in the area of preparatory work. I will explain these in the course of this user manual.



As a little gimmick, the Pro version includes the so-called “**Overture Player**” to play the music parts of movies that contain overtures, intermissions, entr'actes, and/or end music from within the software.

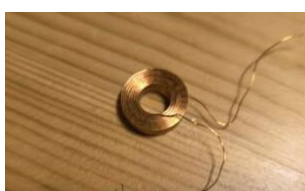
How are the pulses for Film-O-Sync generated?

The pulses required by the software are generated using two neodymium magnets and a magnetic coil. The magnets must be located on a part that rotates completely **once per frame**. The rotating movement of the part and the opposite polarity of the two magnets—one positive and one negative—are used to generate a curve with the help of the magnetic coil. The signal is then fed into the microphone input of your sound card, which allows Film-O-Sync to determine the frame rate for your projector based on the rotations. However, some sound cards may not provide the required level at the microphone input. Unfortunately, the only way to find out is to try it out.

Combination jacks that use a microphone and speaker in a 3.5 mm jack plug can be used if you have enough soldering skills to make the appropriate cable yourself.

Required materials:

As already mentioned, the actual material costs are less than 10 euros.



I use a **magnetic coil** with an outer diameter of 17 mm, an inner diameter of 8 mm, a thickness of 5.5 mm, 215 windings, 0.3 mm copper enamel wire, and a resistance of approx. 3 ohms ([example](#)), which costs approx. 1 euro each.



I attach these to a soft iron **magnetic coil core** (thickness=8 mm / length=25 mm) ([example](#)), which costs around 2 Euros for a pack of 10.

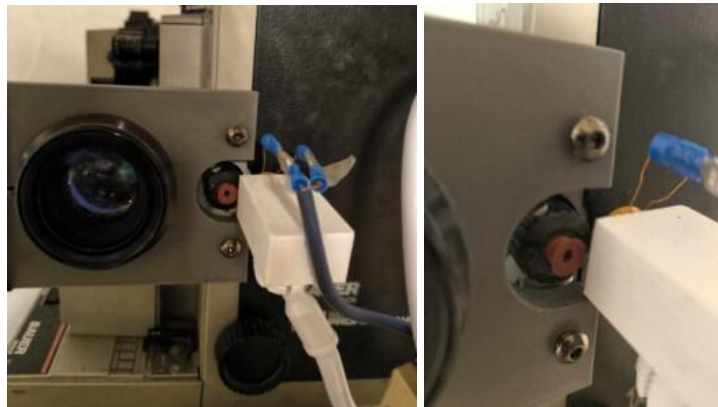
To connect the magnetic coil to the microphone input of your sound card, you should use a **shielded cable** to prevent external interference, but this is not mandatory. I used a suitable RCA cable. Since I'm not particularly good at soldering, I decided to use cable lugs for simplicity's sake.

Finally, you need **two small neodymium magnets** (size 5x2mm), which I – shame on me – ordered from Temu for around €2 for 100 pieces ([example](#)). As already mentioned, these are attached **once with the + side and once with the - side** to a part that rotates completely once per frame.



Because it has already proven itself with the Synkino and I don't want any internal installations, the neodymium magnets were attached to the handwheel of my Bauer P8 TS using mounting adhesive or superglue.

I still had a gooseneck with a ball head from another craft project ([example](#)). For this, I used a 3D printer to print a holder for the spool core and spool, which I attach to the projector table. You can also find this print file in the [downloads](#) section at the bottom of the website.



Zach Poff, the original developer, has installed the whole thing in his Elmo 16 CL. You can find his installation instructions on his website at the link mentioned at the beginning.

Preparatory work for playback

This is probably the most time-consuming and labor-intensive part of the whole process. But you only have to do it once per film.

To create the appropriate audio files, take a look at the “[Post-recording and synchronization](#)” category on my website. Sorry, but it is only available in German, although it can easily be translated using Google etc. There you will find not only the series of articles of the same name, but also lots of other useful information on this topic.

Which file formats can be played by Film-O-Sync 2.0?

Uncompressed file formats: *.AIFF, *.FLAC, *.r64, *.WAV

Compressed file formats: *.mp3, *.ogg

The files should be in 48 kHz. I work exclusively with the OGG format because it offers the best balance between sound quality and storage requirements.

What do I need for playback in 4.0 or 5.1?

To play multi-channel files, you need an ASIO-compatible sound card with at least 6 output channels. For example, I use an (old) Native Instruments Audio 8 DJ.

Since these usually use pairs as outputs, they should be connected as follows:

Channel 1 & 2: Front left / Front right

Channel 3 & 4: Rear/Surround left / Rear/Surround right

Channel 5 & 6: Center / LFE

Your 5.1 amplifier should have analog inputs (e.g., RCA) for each channel. This order was chosen deliberately so that in some cases “only” 4.0 playback, only front and rear, can be achieved. However, this also means that you are not dependent on a single 5.1 amplifier, but can just as easily connect 2 or 3 stereo amplifiers to the respective channel pairs.

Which file formats can be played back in 4.0 or 5.1 with Film-O-Sync Pro?

In short: all of the ones mentioned!

Of course, some will now say that mp3 does not support multi-channel formats. That's true. However, Film-O-Sync 2.0 does not play a single multi-channel file, but up to 3 stereo files with corresponding content. The reason for this is that the manufacturer of the software's programming platform saved money on licensing time stretching (pitch correction), which means that multi-channel playback is possible in the paid subscription version, but only stereo works after creating a standalone version. So I developed a workflow that makes it possible anyway: 3 stereo players with front, rear, and center/LFE are “fed” and controlled in parallel.



Since the players are automatically loaded with the corresponding files in the background, it is important that the respective file name extensions are correct.

5.1: _1front.xxx / _2rear.xxx / _3center_lfe.xxx

4.0: _1front.xxx / _2rear.xxx



La Bamba FOS Akt 2 51 25 _1front.ogg



La Bamba FOS Akt 2 51 25 _2rear.ogg



La Bamba FOS Akt 2 51 25 _3center_lfe.ogg



To avoid making things unnecessarily complicated for you, the corresponding conversion scripts for FFMPEG are available [on my website](#) as batch processing files under “Downloads” at the bottom of the page. However, FFMPEG itself is not included in the downloads. You can get the program [here...](#)

However, this does **not apply to the Overture player**! Since no time stretching is necessary here and, to be honest, I didn't feel like going to the trouble of setting up three parallel stereo players for four additional player units that are rarely used, multi-channel output is possible here. But here, too, the corresponding scripts are included in the aforementioned download.

What needs to be considered in the Overture player regarding the order of the 4.0/5.1 channels?

I use the following abbreviations for the channels:

FL = Front Left

FR = Front Right

RL = Rear/Surround Left

RR = Rear/Surround Right

FC = Center

LFE = Subwoofer

Basically, the channel order within the files is FL | FR | FC | LFE | RL | RR

Apart from the OGG format, this is also the default for multi-channel formats. However, OGG uses: FL | FC | FR | RL | RR | LFE. Since it is not possible to reroute within the file, the playback path of the Overture player has been adjusted. Therefore, the appropriate file format must be selected before playback.

How do I create a stereo downmix of multichannel files?

To make a multichannel file, such as *.aac or *.ac3, usable in the **Lite version**, a so-called downmix is necessary. Here, the signals from the center and LFE are slightly reduced in volume and included in the two front channels. You can also find a corresponding conversion script for FFMPEG on my website (see the penultimate chapter for the link and comments).

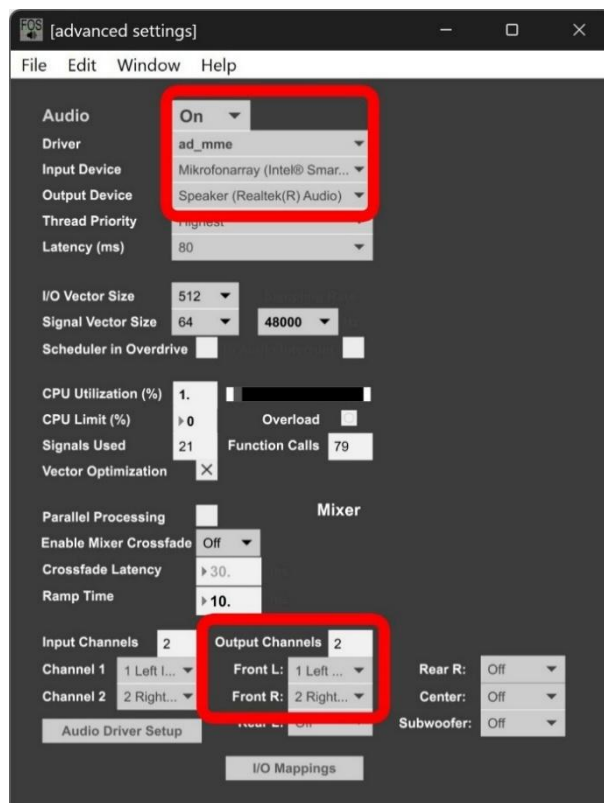
Setting up Film-O-Sync for playback

After starting the program for the first time, you should first check your audio settings. To do this, click on the corresponding button.



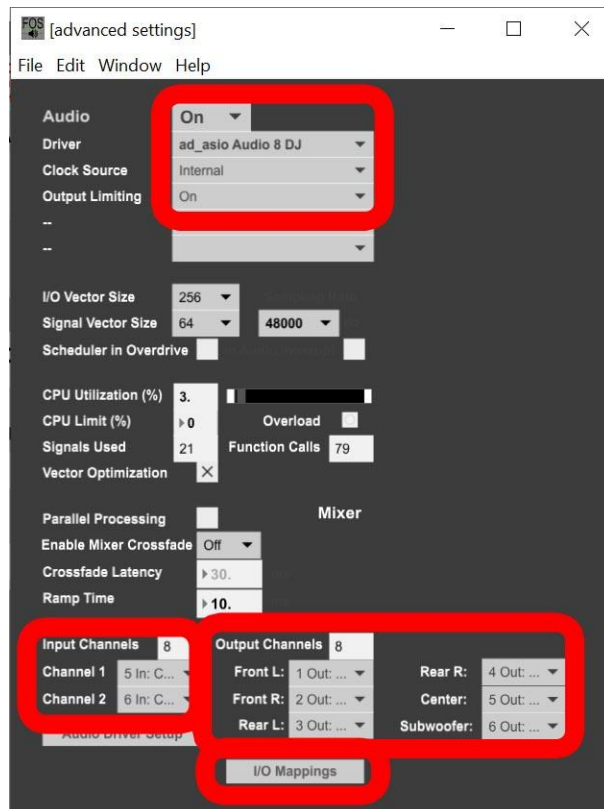
Stereo

With a standard stereo sound card, the inputs and outputs are usually detected and entered automatically. However, make sure that the first entry is set to "On." Only the channels for front left and front right are assigned here.



4.0 / 5.1

For multi-channel playback, it is best to select the ASIO sound driver and the entries for the respective speakers. However, make sure that the first entry is set to “On”.

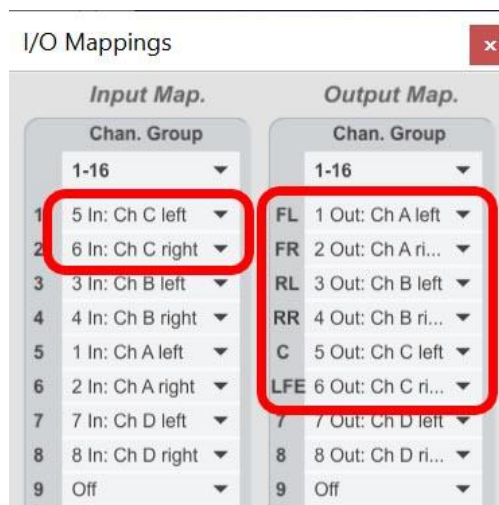


To be on the safe side, check the assignments again using the “I/O Mappings” button.

Since most connections are stereo, the outputs must be in the following order:

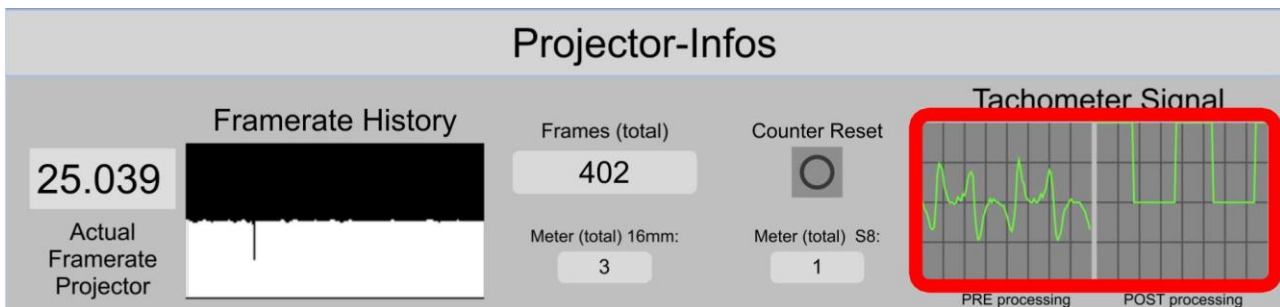
Channel 1 & 2: Front Left / Front Right
Channel 3 & 4: Rear Left / Rear Right
Channel 5 & 6: Center / LFE

The microphone input of such sound cards for impulse reception can be on different channels. For example, on my Focusrite it is channel 1, and on my Native Instruments it is channel 5.



Setting up the pulse signal

Once these settings have been made, start the projector and adjust your pulse signal in the “Tachometer signal” section using the level control on your sound card so that the frame rate is detected correctly. Don't be surprised if it fluctuates, as the projector is and remains mechanical with a certain amount of drive belt slip.



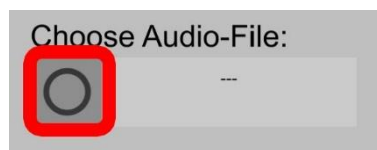
Playback with Film-O-Sync 2.0

Once setup is complete, playback can begin.

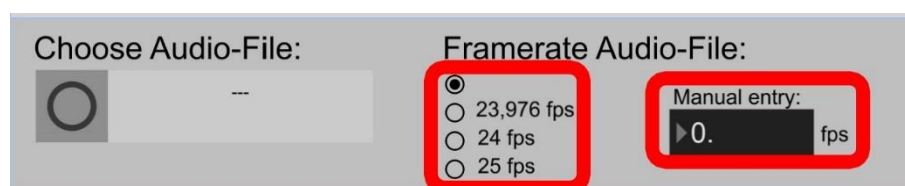
Since the two versions require different procedures, they must also be described separately.

Playback with the Lite version

Use the button next to “Select audio file” to open the file you want to play.



Then select the frame rate you want to synchronize with by clicking on it. However, if you need a different frame rate, such as 18 fps for homemade movies, you can enter this value manually on the right. **Commas** must be written **with a dot**.



Playback itself (unfortunately) always has to be started manually, which may require some practice. There are different ways to do this.

For my part, I start the film at my blue sticky note from the filming and stop it again. Then I activate Film-O-Sync 2.0 before restarting the projector. To do this, I shortened the lead-in from filming by about 3 frames. This corresponds approximately to the milliseconds that my Bauer P8 TS needs to reach the countable speed. However, this varies from projector to projector.

As an alternative, you can also use 2 start frames, for example with a single counter. You can find more details in part 4 of the above-mentioned series of articles in the “Preparations” section under “Non-synchronizable projectors.”

If you are quick enough to start the projector and Film-O-Sync playback at the same time using the space bar, then it would be the third option.

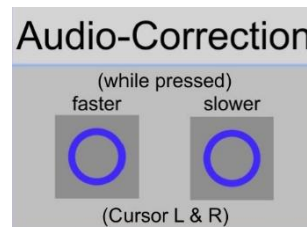
In any case, playback is started by pressing the green button or, alternatively, the space bar.



Do not press it twice, because then the audio file will start over again.



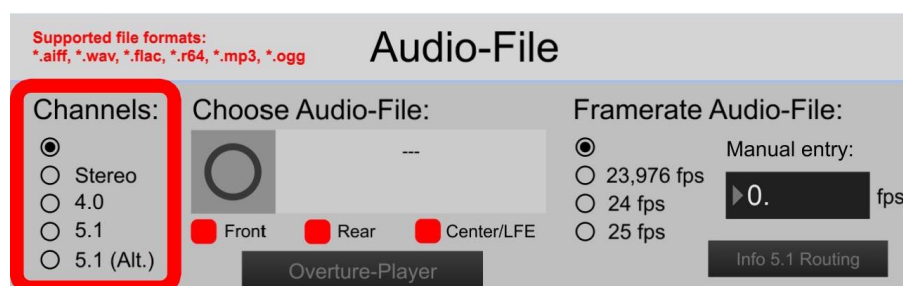
Deviations may occur, primarily at the beginning of the act, but also during the film. However, you can compensate for these using the left arrow key (temporarily speed up playback) and right arrow key (temporarily slow down playback) or by clicking on the respective buttons under “Audio correction.” As long as you hold these down, the corresponding action will be performed. This can sometimes cause a display error because the square does not disappear. However, the function works exactly as it should in the background.



Now enjoy Film-O-Sync 2.0!

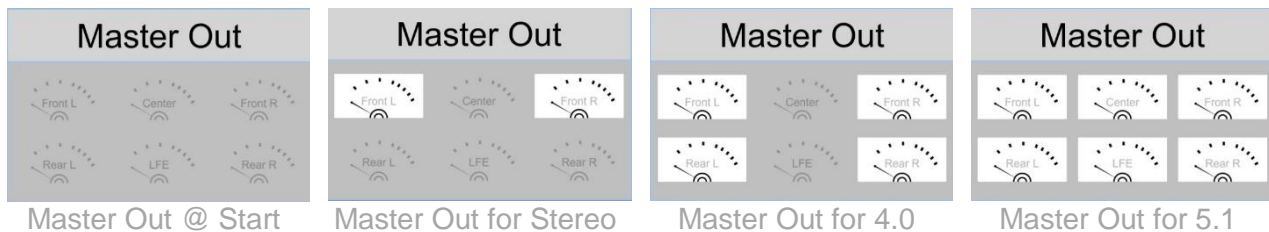
Playback with the Pro version

First, select the audio format you want to play back.

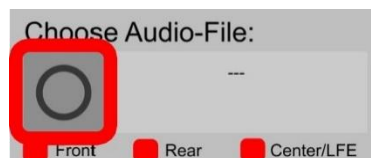


The file selection window for playback opens immediately after selection. In the case of 4.0 or 5.1, use the file with “xxx_1front.xxx”. The remaining necessary files are automatically loaded into the other player(s). If this is successful, the LEDs under the file name turn green.

Don't be surprised that all level meters in the “Master Out” section are still deactivated. As soon as you make a selection under “Channels,” the necessary ones will be activated.



If you need to replace a file, for example because you selected the wrong one, click on the button next to “Select audio file.”



Then select the frame rate you want to synchronize with by clicking on it. However, if you need a different frame rate, such as 18 fps for homemade movies, you can enter this value manually on the right. **Commas** must be written **with a dot**.



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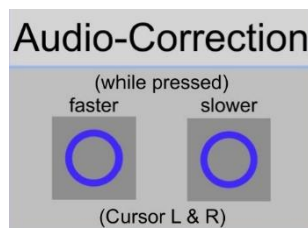
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Do not press it twice, because then the audio file will start over again.

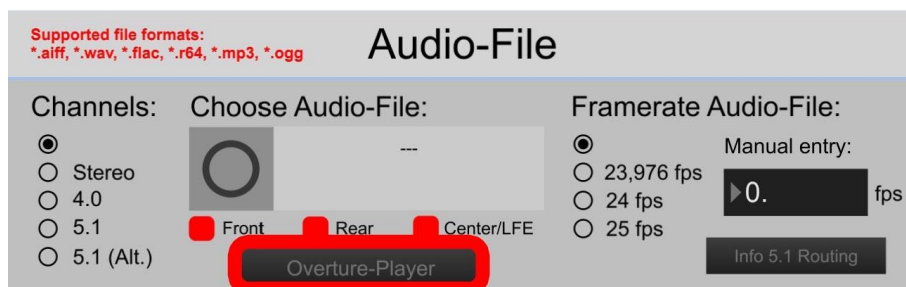


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The Overture-Player

Some films have instrumental parts (overture, intermission, entr'acte, and/or end music) that were not copied to the act. To avoid having to perform any tricks to play these in multi-channel mode, I have included the so-called Overture Player. You can open this by clicking on the button of the same name in the audio file area to load the individual players.



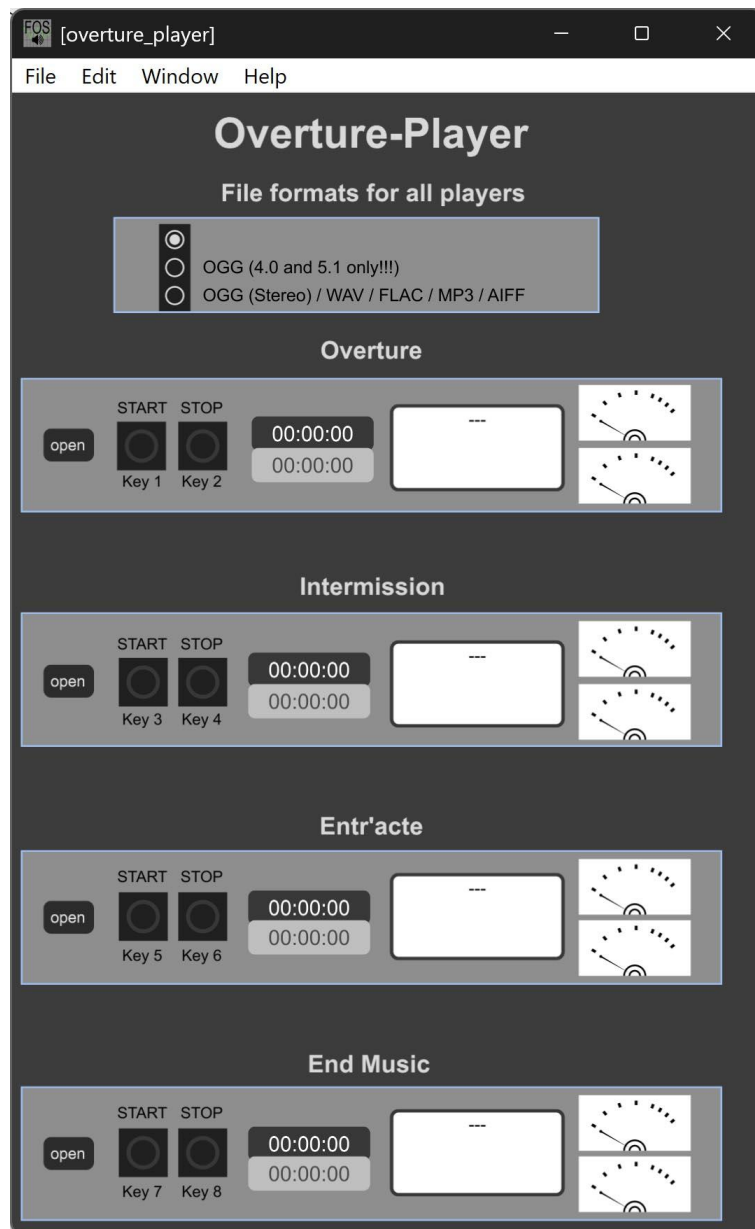
The Overture Player window does not need to be open to play the files! The individual players can also be started or stopped from the control screen using the numbers 1 to 8.

As I said at the beginning, I wanted to keep the programming effort for the Overture player as low as possible because it is rarely needed. For this reason, there is only one player per program part that is loaded with a multi-channel file. To create this, you should use the scripts from my batch package to avoid confusion with channel distribution. This is especially important if you want to use 4.0, because OGG is not designed for this. However, I managed to do it with a trick, which can be found in the corresponding batch script.

Since the OGG format uses a different channel distribution for 4.0 and 5.1 than all other file formats, you must first tell the players which format you are using for all players. However, you can also change or select the format later. This is simply a matter of routing the outputs to the correct channels.



Then you can load the players.



You can then close the window and start and stop the individual players using the number keys mentioned above.

And now have fun with Film-O-Sync 2.0!