Tools

videoReferee®

Introduction

This document is intended to help you understand the structure of the tools and settings in the *Tools* panel. It describes the contents, descriptions and usage of the *Tools* menu sections.
The *Tools* menu is used for additional configuration of system components and program interface management.
This guide also describes the "Audio Panel" section.
For information on using the main program interface, please refer to the separate "*videoReferee®* User's Guide."

> Users must have the skills to use a computer running the Windows operating system (OS), know the rules for safe computer operation and the basics of working with the Windows OS.

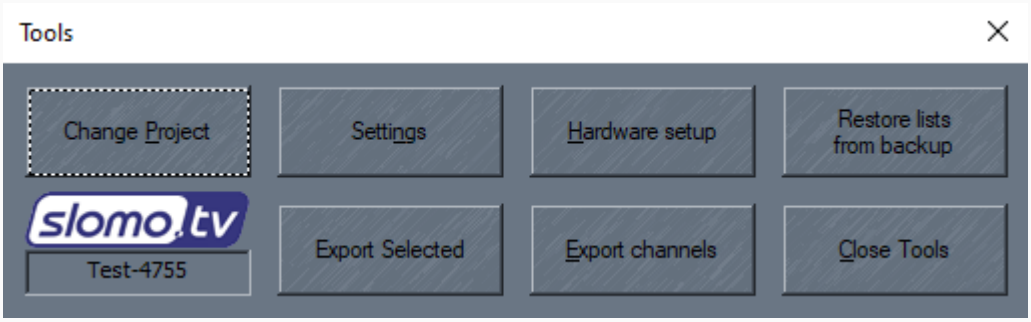
Opening *Tools*

The *Tools* menu can be opened in one of the following ways:

- Click the  button in the toolbar (in the upper-right corner of the program)
- Press **Ctrl + Shift + T** on your keyboard.

This will open the *Tools* window (figure 1).

Figure 1 – Tools Window



The following settings are available from the *Tools* window:

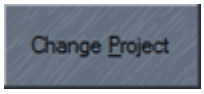
- Change Project – Project settings;
- Settings – Program settings;
- Hardware setup – Hardware settings;

- Restore lists from backup;
- Export Selected – Export selected moments;
- Export channels;
- Close *Tools*.

The *Tools* window also displays the serial number (S/N) of your server (in the lower left corner).

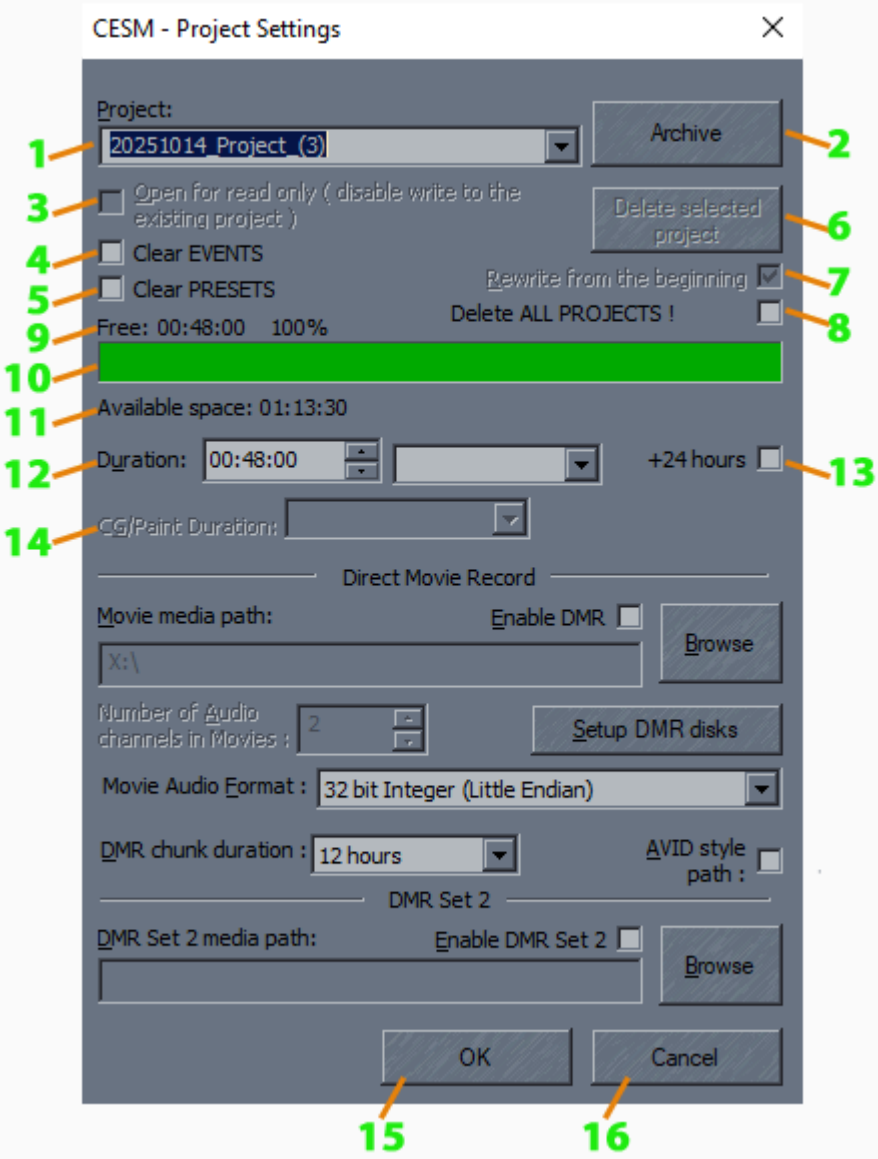
Each button opens the settings menu corresponding to its name. Below is a description of each menu opened by clicking the corresponding *Tools* menu button.

Change Project

To access the *Change Project* menu in the *Tools* window, click the 

button. Clicking the button will open the window shown in figure 2.

Figure 2 –CESM window – Project Settings



1 – New project name entry field; icon displays and opens previously created projects.
2 – Starts archiving the current project – see Archiving Projects.
3 – Check box to open the project for editing. This option is disabled when creating a new project.
4 – Check box to delete all events in the project.
5 – Check box to delete all presets in the project.
6 – Delete the selected project. This option is disabled when creating a new project.
7 – Check box to overwrite the project. This option is disabled when creating a new project.
8 – Check box to delete all projects and free up disk space.
9 – Numeric display of free space in the project.
10 – Graphic display of free space in the project.
11 – Numeric display of available disk space.

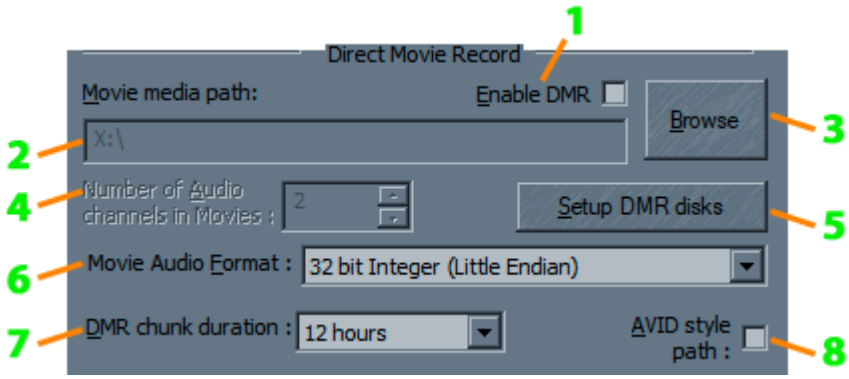
12 – Specify the project duration (in one of two fields).
13 – Check box to add 24 hours to the project duration.
14 – Reserve time for CG/Paint. This parameter is inactive by default.
15 – Confirms entered settings.
16 – Closes the *Change Project* window.

The *Direct Movie Record* and *DMR Set 2* sections are only available with an additional license for DMR™ discs. Without a license, the options in these sections will be disabled.

Setting up Direct Movie Recording (DMR™)

To set up recording on DMR™, we recommend using the Slomo.tv Launcher application.

In the *Direct Movie Record* section, you can configure the simultaneous recording of video not only to a RAID array, but also, at the same time, the recording of HD video and SD proxies in the native formats of non-linear editing systems.



1 – check the box to enable recording to DMR™ discs,
2 – path to the project location on DMR™ discs,
3 – opens a window for selecting a disc for DMR™ recording,
4 – select the number of audio channels to record to DMR™ discs,
5 – click to view the current DMR™ disc settings. The Setup DMR discs window will open (figure 3).

Figure 3 – Setup DMR disks

1 – Select the drive to which the channel will be recorded.
2 – Check the drive's suitability for recording the video stream (evaluate the speed and available disk space).

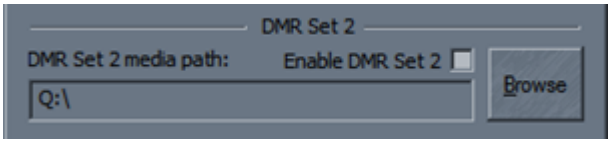
6 – Select the recorded audio format from the drop-down list.
7 – Select the *DMR™ chunk duration* from a preset range (from 5 minutes to 12 hours). This parameter specifies the length of the files created on the DMR™.
When selecting the *DMR™ chunk duration*, it's important to consider the features of the editing system in which you plan to use the recorded material. This is because some editing systems do not work well with very large files or, conversely, with a very large number of files.
8 – Check the box to generate files in the recording format for *AVID Media Composer*.

To save the DMR™ settings, click **OK** in the *Project Settings* window (figure 2).

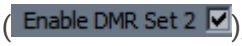
Setting up DMR Set 2

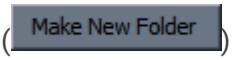
To set up *DMR™ Set 2* recording, we recommend using the Slomo.tv Launcher application.

Slomo.tv systems can record video not only to internal DMR™ drives, but also to any storage device connected to the system. This could be an external DMR™ drive or a remote network storage device.
To configure recording settings for *DMR™ Set 2*, find the *DMR Set 2* section in the *Change Project* window:



and configure the settings:

1. Activate this feature by checking the *Enable DMR Set 2* box (

);
2. Specify the *DMR™ Set 2* recording path. To specify the *DMR™ Set 2* recording path, click the **Browse** button and, in the window that opens, select the *DMR™ Set 2* recording path (network location/drive/folder), or create a folder on the desired drive by clicking the **Make New Folder** button (

).

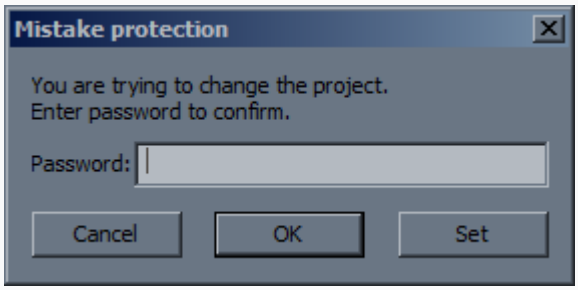
To save the *DMR™ Set 2* settings, click **OK** in the *Project Settings* window (figure 2).

Create new project

> ⚠ This project creation method is optional. To create a new project, we recommend using the Launcher app – see the Slomo.tv Launcher User Guide or *videoReferee®* User Guide, section "Creating a Project."

To create a new project, enter a name for the new project in the "*Project*" line in the *Project Settings* window (figure 2). Place your mouse cursor in the name entry field, and the program will automatically prompt you to enter a password in the *Mistake Protection* window that opens (figure 4).

Figure 4 – Password request window for project modification



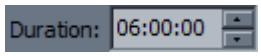
If a password for this action was previously set, enter the desired password in the *Password* field of the password prompt window and click **OK**.

If no password has been set, click **OK** in the password prompt window to confirm the project change, leaving the password field blank.
After confirming the password, you will be able to enter a name for the project being created in the "*Project*" line (figure 2).

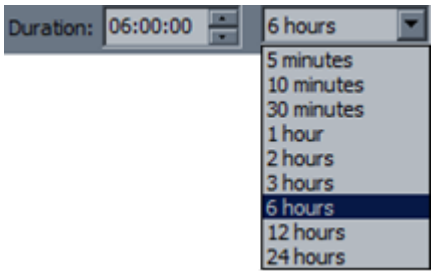
After entering the name, set the project duration.

Setting the project duration

When creating a new project, you must specify the project duration (recording time). The project duration is set in the "*Duration*" line (figure 2).

You can set the duration by entering a specific value in hours, minutes, and seconds in the 

field, or by selecting from a preset range in the drop-down list:



Once you have selected the project duration (effectively the storage size) and started working with the project (recording), you will not be able to change the project duration!

Opening an existing project

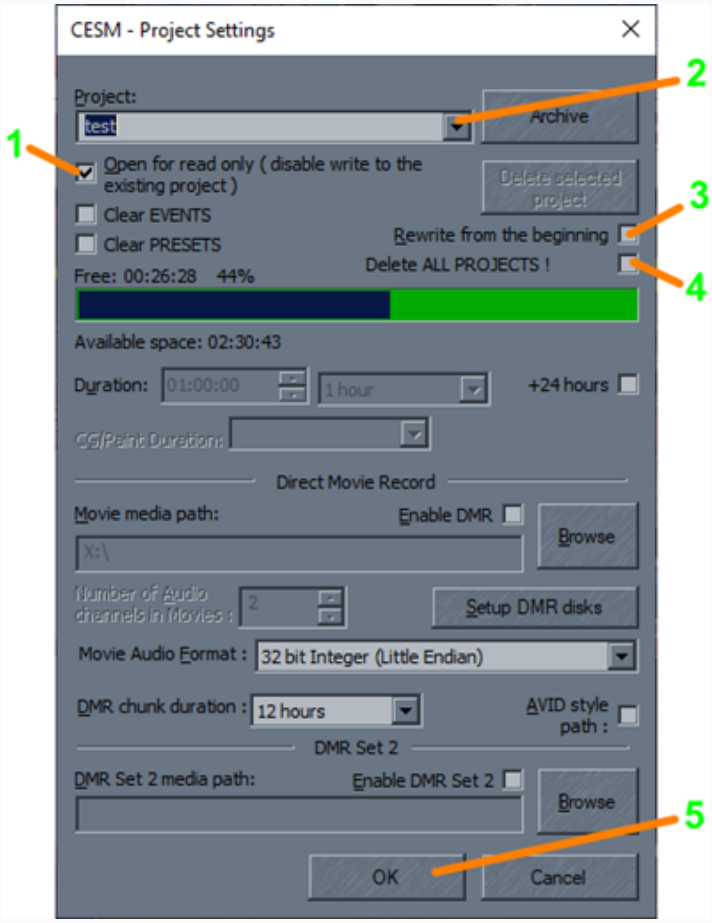
This method of opening a project is optional. To open an existing project, we recommend using the Launcher app – see the slomo.tv Launcher User Guide, section "Getting Started" or the *videoReferee®* User Guide, section "Choosing a Project".

A previously created project can be opened in one of two ways:

1. In the *Project Settings* window (figure 5), enter the name of the desired project in the "*Project*" line;
2. Left-click the drop-down list icon and select the previously created project from the list.

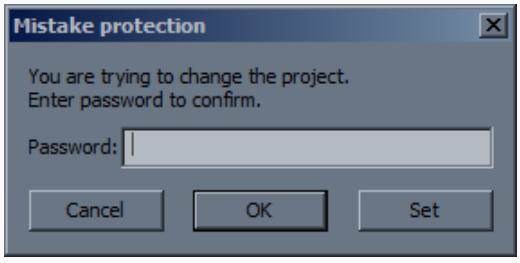
With either method, the program will automatically prompt you to enter a password to modify the project in the *Mistake Protection* window that opens (figure 6).

Figure 5 – Opening a previously created project



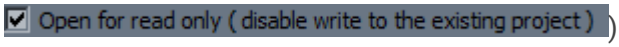
1 – Uncheck to open a project for editing
2 – Click to select a project
3 – Check to overwrite a project
4 – Check to delete all projects and free up disk space
5 – Confirm settings

Figure 6 – Password request window for project modification



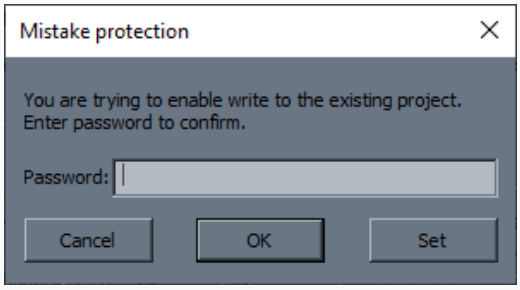
If a password has been previously set, enter the password in the *Password* field and click **OK**.
If no password has been set, click **OK** to continue, leaving the password field blank.

After confirming the password, you will be able to select a project name from the drop-down list or enter the name of a previously created project.

When opening a previously created project, the "*Open for read only (disable write to the existing project)*" () protection feature is enabled by default.

To edit an existing project, disable this feature by unchecking the checkbox. This will open the *Mistake Protection* window, prompting you for a password (figure 7):

Figure 7 – Password request window to activate recording in an existing project



If a password has been previously set, enter the password in the *Password* field and click **OK**.
If no password has been set, click **OK** to continue, leaving the password field blank.

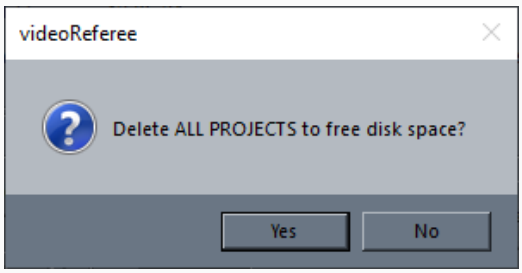
Rewriting a project

When opening a previously created project or making a mistake in the current project, you can overwrite it. To do this, enable the "*Rewrite from the beginning*" option (Rewrite from the beginning ☐). The selected project will be overwritten from the beginning, erasing any previously recorded information. If this option is not enabled, recording will resume from the end of the previous recording.

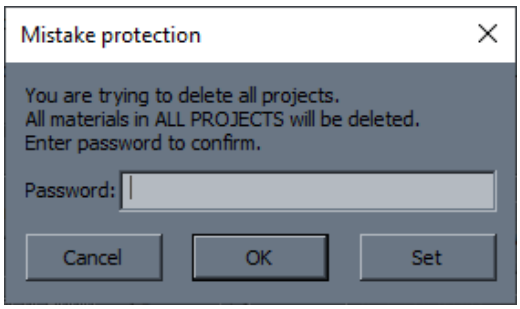
Deleting all projects

If you run out of space on the internal array when creating a project, you can use the *Delete ALL PROJECTS* option if all existing projects are no longer needed.

To delete all previously created projects, enable the *Delete ALL PROJECTS* option (☑ Delete ALL PROJECTS !), then a confirmation window will automatically open.



Click **Yes** and confirm the deletion of all previously created projects in the password prompt that appears:



If a password has been previously set, enter the password in the *Password* field and click **OK**.
If no password has been set, click **OK** to continue, leaving the password field blank.

To complete deleting all projects, click the **OK** button in the *Project Settings* window (figure 2).

Archiving Projects

When you switch to working with 3G-SDI signals (1920x1080 50p), the data stream recorded to the hard disk doubles. As the result, the HDD-based system is operating at the limit of its performance. There are several ways out of this situation.
The first way is to reduce the operation speed. In fact, it makes the system less interactive. For example, four channels will be searched at 1 frame per second.
The second option is to replace HDDs with high-performance SSDs. The use of SSDs has many advantages, such as faster search through the recorded material. However, the price of this solution is quite high.
The third way is based on the fact that HDDs have maximum performance at their physical beginning. Based on this knowledge, this part of the hard drive can be allocated as a "fast" video array, where there is no slowdown or degradation of the recording/searching process. However, the size of such an array is small and allows you to record only one or two games, depending on the duration. The second part of the disk array may be used to store recordings of matches which should be saved for further analysis or for submission to the Federation on request. Thus, the main work is performed on the array created from the high-speed part of the hard disks, and the rest of the disk space is used for archiving.
A hybrid disk subsystem is also possible, in which the small (i.e.,"fast") part is made on the basis of high-performance SSDs, and the hard drives create an archive subsystem to which the data is archived.
This third option is implemented in slomo.tv HDD-based *videoReferee®* systems with support for 3G-SDI signals.
The **Archive** button allows you to transfer the projects recorded on the "fast" part of the array to the "slow" part. In this case, it is possible to work with the recorded material in the same way as with the projects in the "fast" part.
Since during the "offline" work with the recorded material (review, analysis of moments, training, etc.) the recording to disks is not performed, the work with the "archive" array is as quick as the work with the "fast" one.

We recommend archiving all finished projects.

To archive a project (figure 8):

1. select the project you want to archive in the "*Project*" field

2. click the **Archive** button,
3. in the confirmation window (figure 9), click **Yes** to continue or **No** to cancel.

Figure 8 – Project Settings – Archive project

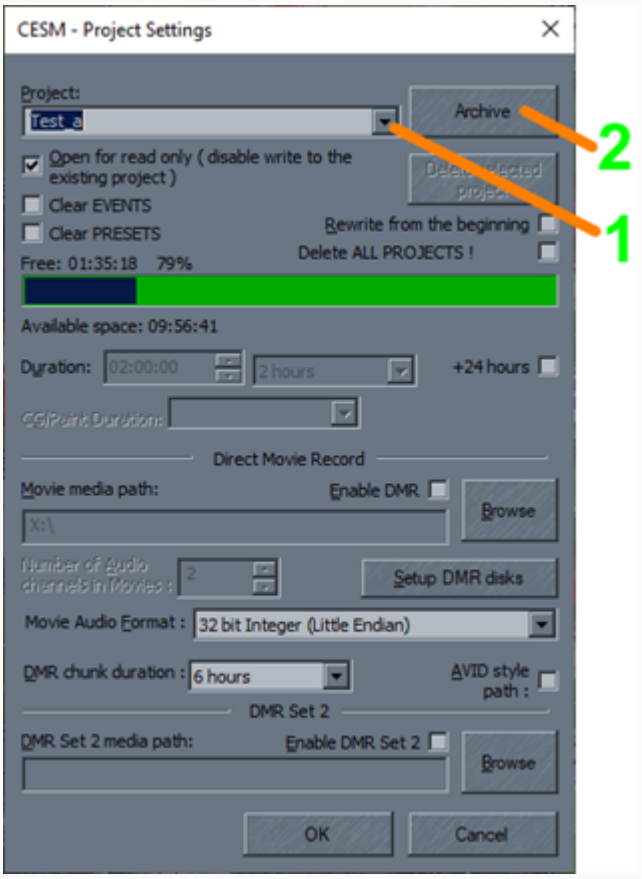
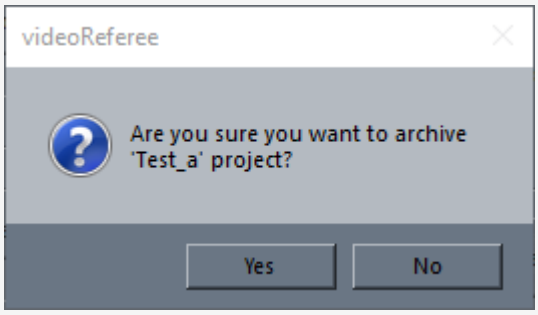
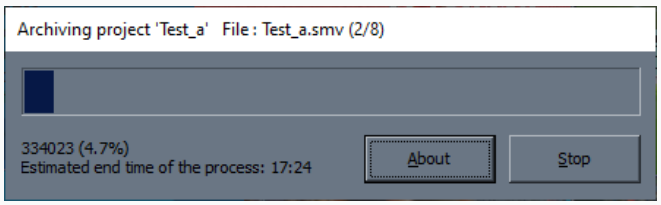


Figure 9 – Confirmation of project archiving



During the archiving process, the progress window will be shown (figure 10). It will be closed automatically, when the archiving is done.

Figure 10 – Archiving progress window



To abort the archiving, press **Stop** button.

After pressing the **Stop** button, the window to confirm the abortion of the archiving process will open (figure 11). Press **Yes** to continue or **No** to cancel. If the **Yes** button was pressed and the archiving was aborted, the confirmation message will appear – figure 12.

Figure 11 – Confirmation window - Abort archiving

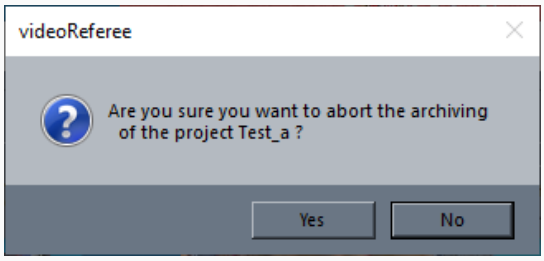
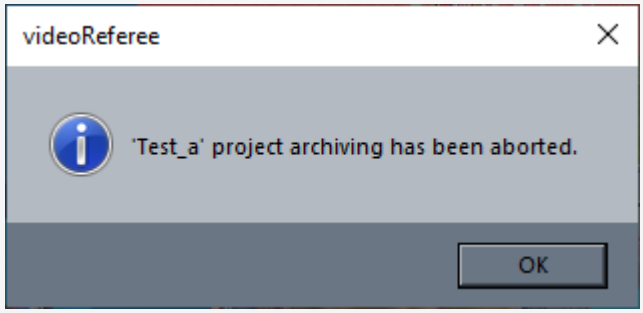


Figure 12 – Information window – Successful abortion of archiving process



If the project has been archived successfully, the "*A:*" prefix will be shown in front of the project name in the *Project Settings* window. Also, a message stating that the project has been archived will be displayed above the project name – "*The project has been archived*" – figure 13.

If the project archiving has been aborted, this project has a "*P:*" prefix before the its name, and a message "*The project archiving has been paused*" is displayed above the project name – figure 14. To finish an interrupted archiving, simply click the **Archive** button for such a project again and wait for the archiving process to finish.

Figure 13 – Archived project

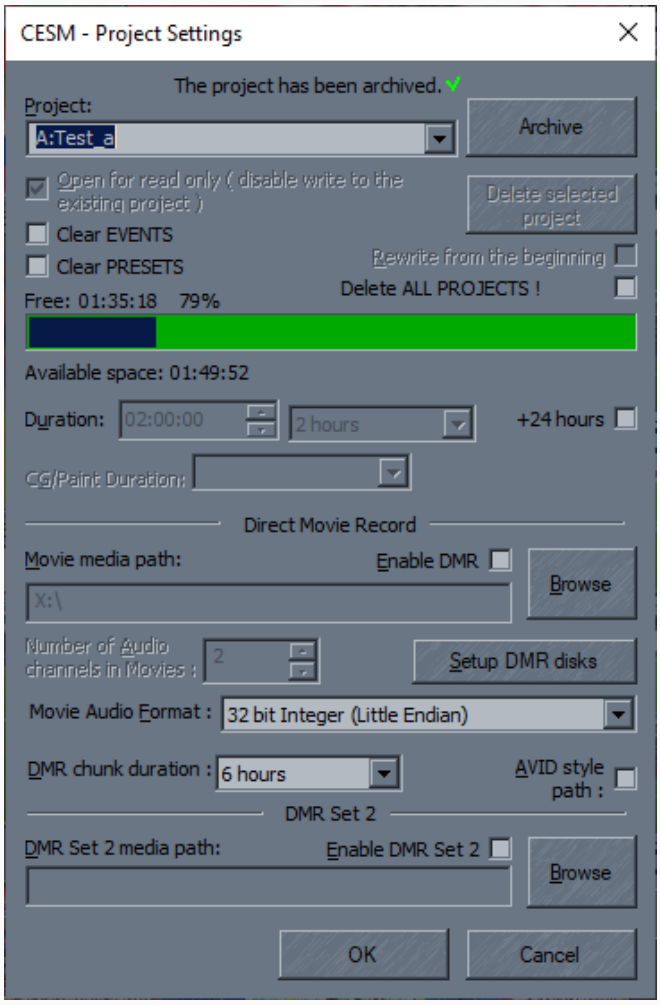
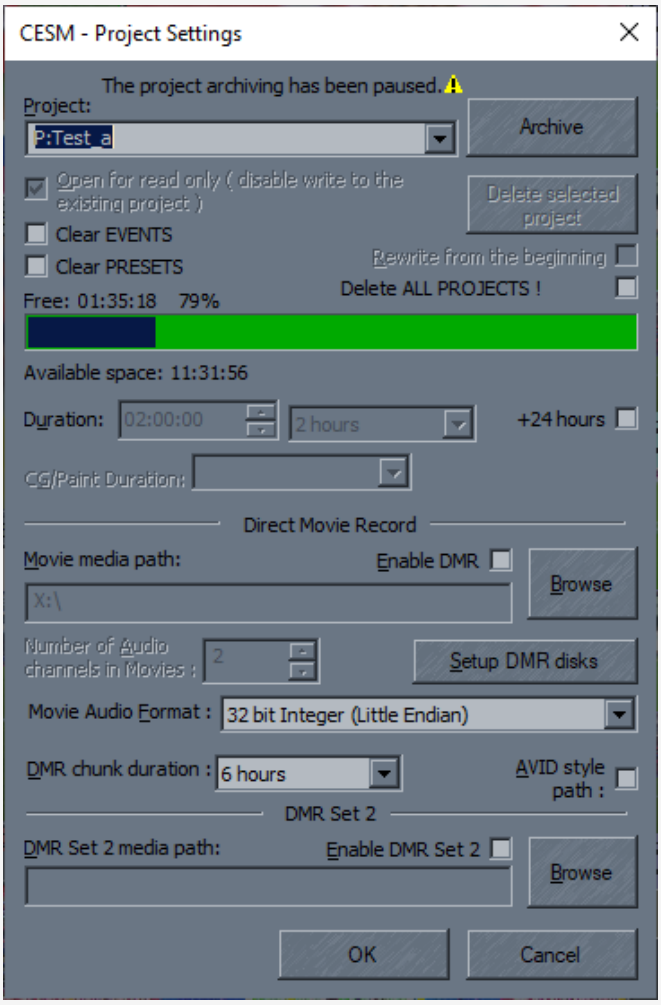
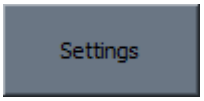


Figure 14 – Project archiving was interrupted



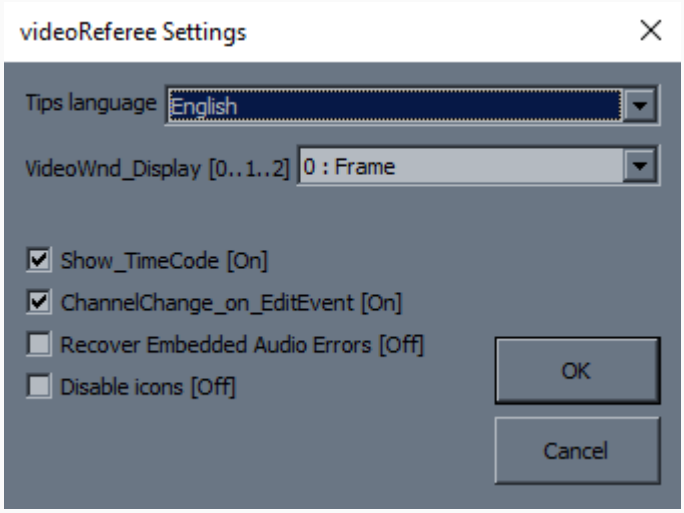
Settings

The *Settings* menu allows you to customize the program interface.

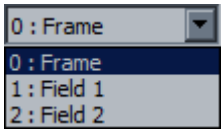
To access the *Settings* menu, click the 

button in the *Tools* window. Clicking this button will open the window shown in figure 15.

Figure 15 – Settings



- The *Tips language* parameter specifies the language of the tips displayed when you hover the mouse over an element in the main program window. The display of tips is enabled/disabled using a  button in the main program window.
- The *VideoWnd_Display* parameter controls the display area of the frame on the display – upper or lower – and can take the following values:



0: Frame – full frame,
1: Field 1 – show only the top field,
2: Field 2 – show only the bottom field

Toggle this setting to diagnose problems that occur in only one field of the frame.

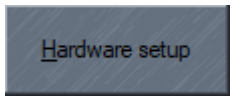
- *Show_TimeCode* checkbox – enables/disables incoming timecode (if present). Used only for live replays.
- *ChannelChange_on_EditEvent* checkbox – enables/disables fixing the active channel when a cue is placed.
- *Recover Embedded Audio Errors* checkbox – enables/disables the built-in audio error correction feature.

If an audio error indication appears, it is recommended to listen to the audio to confirm that it is a systematic error and not just random interference. Once the systematic error is confirmed, you should first attempt to correct the error by configuring external audio sources. Only after these attempts are unsuccessful should you activate the built-in audio error correction feature.

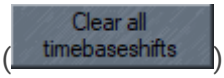
- *Disable icons* checkbox – enable/disable displaying icons in the event list. When disabled, the markers are displayed as a freeze frame of the moment; when enabled, they are displayed as text information about the event.

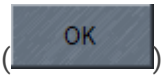
The information displayed about a marked event varies depending on the sport.

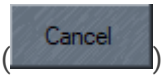
Hardware setup

The *Hardware Setup* section of the *Tools* menu configures parameters for internal boards and devices. To access the *Hardware Setup* menu, click the 

button in the *Tools* window. The menu has several tabs, each of which configures a specific hardware device.
The bottom field of the window displays parameters that apply to all tabs simultaneously:

- The **Clear all timebaseshifts** (

) button resets all set delay values.
- The *Auto select input channels* checkbox enables/disables automatic display of the channel selected in the *Hardware setup* window in the monitoring window.
- The **OK** (

) button saves the changes made.
- The **Cancel** (

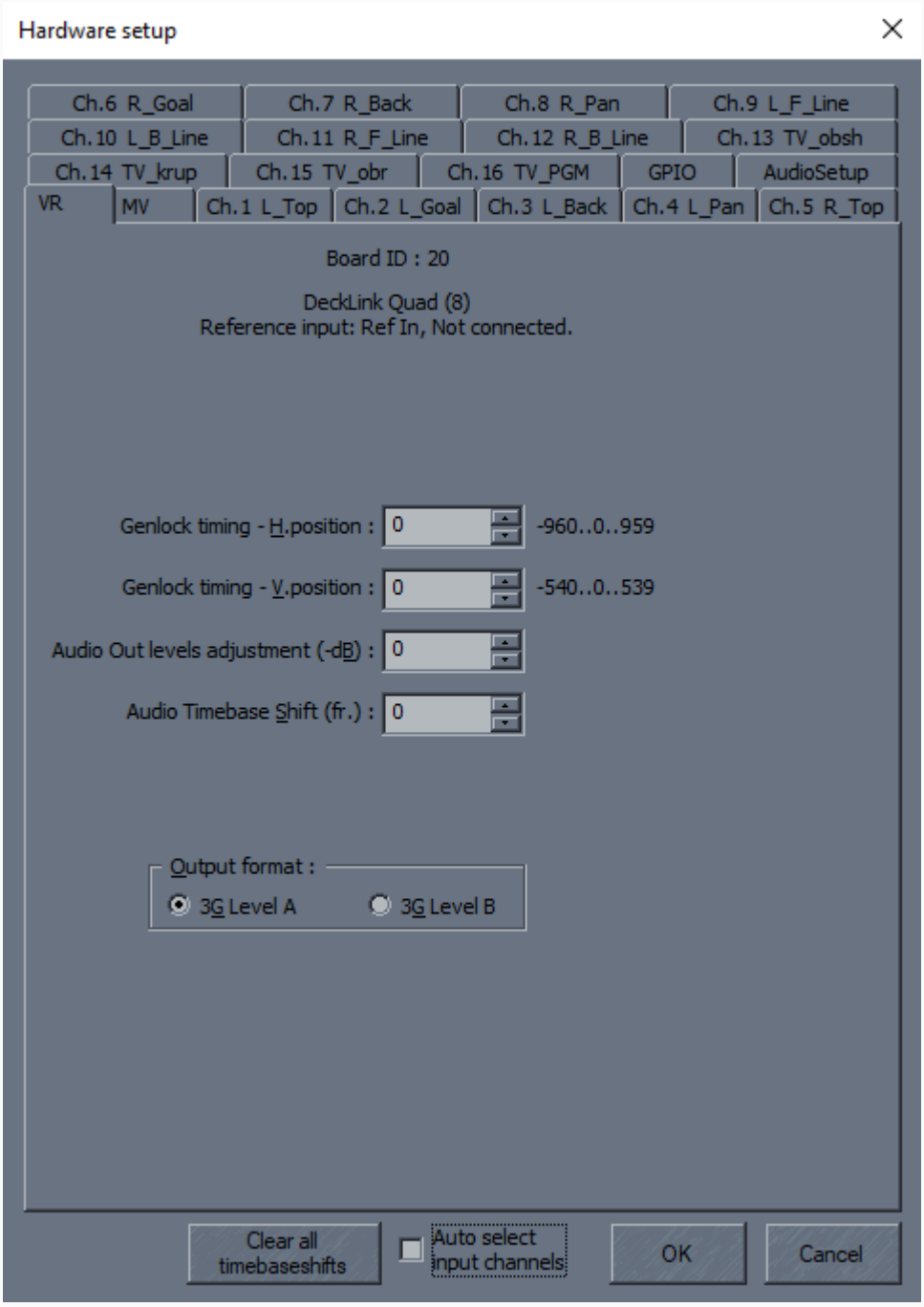
) button closes the window without saving the changes made.

Almost all settings in the *Hardware Setup* menu are applied immediately. For example, when changing the audio level in the "*Audio Out levels adjustment*" parameter, the channel's audio will be boosted or cut immediately upon changing the boost/cut value, not upon clicking the **OK** button. Clicking the **OK** button only saves the entered settings to the INI file, but they are applied immediately. The **Cancel** button cancels the applied settings.
Therefore, it is recommended to adjust all important parameters before recording, as any adjustments during recording may affect the quality of the recorded material.

VR tab

This tab is used to configure the referee's monitor output. The available parameters depend on the supplied configuration.

Figure 16 – Hardware setup – VR tab



The following parameters are available for configuration (figure 16):

- *Genlock timing – H.position* and *Genlock timing – V.position* – adjust the synchronization of video signals and equipment using a single reference signal,
- *Audio Out levels adjustment (-dB)* – adjust the volume of the output audio signal;
- *Audio Timebase Shift (fr.)* – adjust the timebase shift of the audio relative to the video,

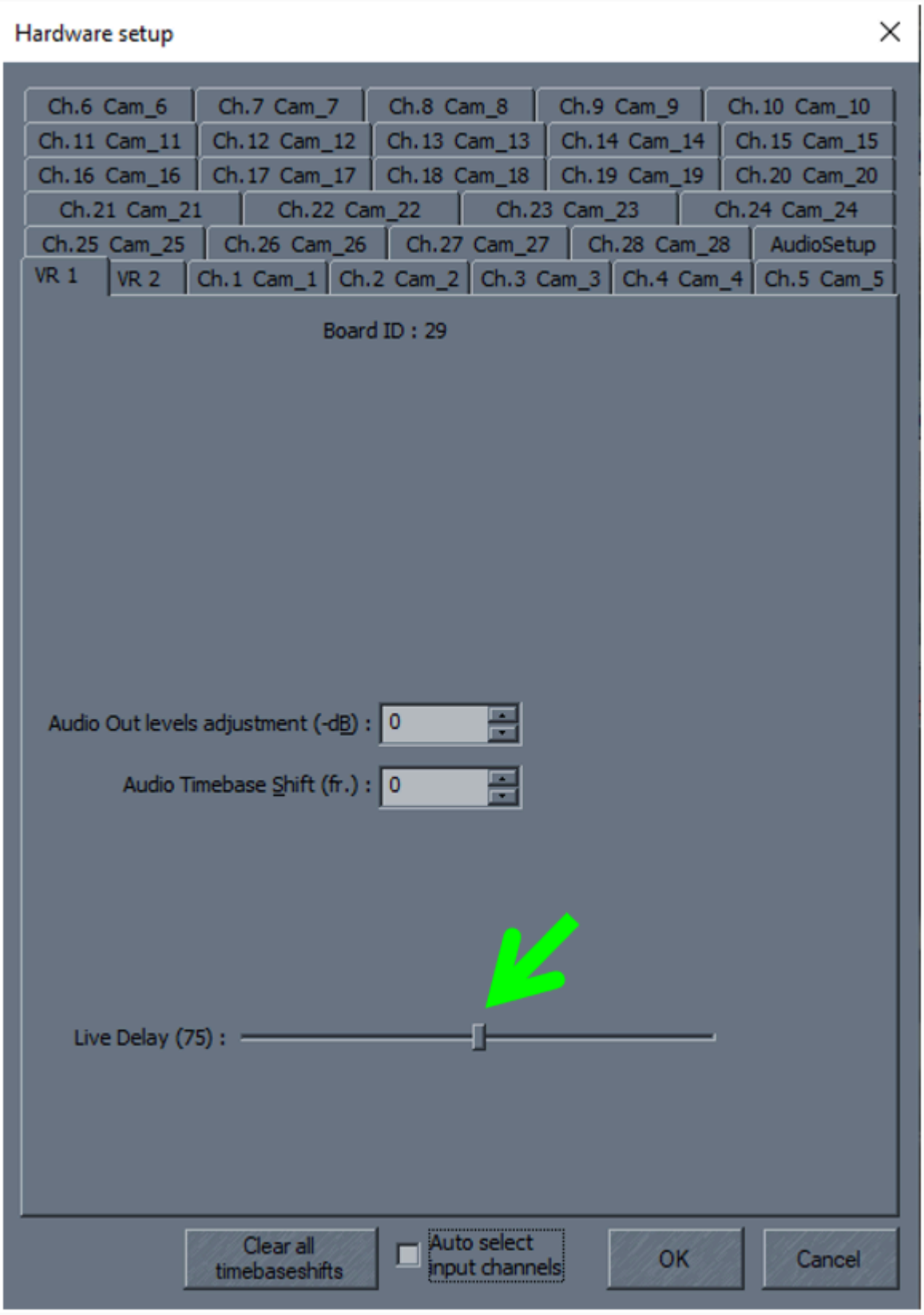
- *Output format* – select the encoding and transmission method for the video signal:
  - *3G Level A* – direct encoding of data for 3G-SDI as a single descendant,
  - *3G Level B* – combines two 1.5G-SDI (Dual-Link) streams into a single 3G signal.

Video delay

The video referee system supports video delays of several seconds. Live windows display video delayed by the configured delay, not live video. In this case, event marking occurs relative to the event time currently displayed on the referee's monitor. If an event is delayed, the marking will also be delayed.
The delay is very memory-sensitive and requires significant system resources, so it is not possible to set a maximum value immediately. Using a large number of channels may result in insufficient memory. The operator can adjust the delay value from 0 to the maximum value. The maximum value is not user-configurable; it is set by the manufacturer[1] during configuration.

1. To change the maximum delay value to another one, you need to contact technical support.

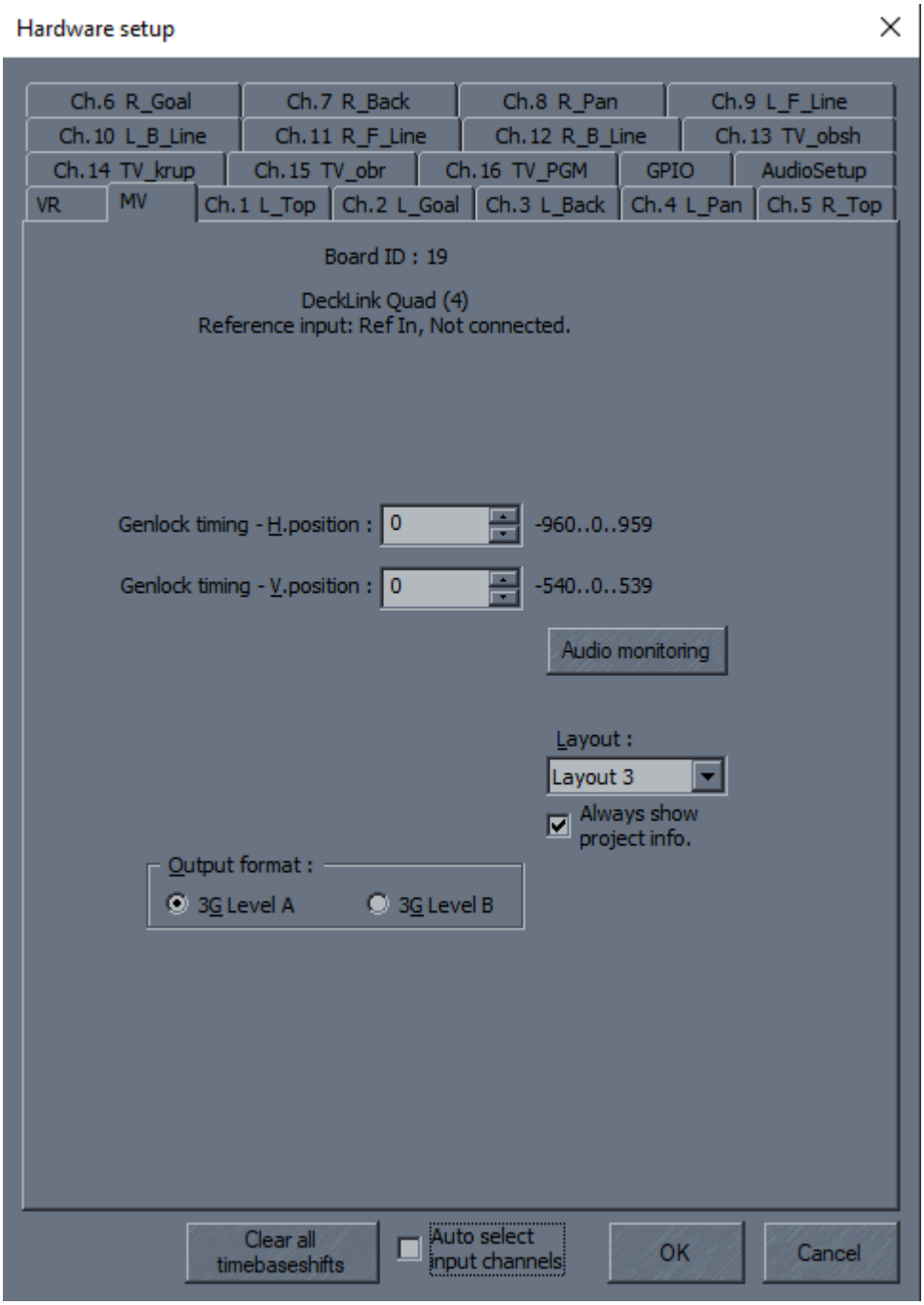
Figure 17 – Live Delay



The delay value is adjusted using the *Live Delay (c)* slider, where c is the current delay value.
This setting is applied immediately, meaning that as you move the slider, you can immediately see the delay in the live windows, allowing you to set a comfortable value.
When *Live Delay* is set, video is displayed in the Multiviewer without delay (Live), and with a delay (Live Delay) in the referee and operator interfaces.

MV tab

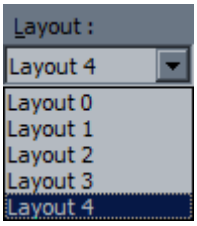
This tab is used to configure the output for the Multiviewer and has the following settings:



- *Genlock timing – H.position* and *Genlock timing – V.position* parameters – configure synchronization of video signals and equipment using a single reference signal,
- **Audio monitoring** button (

) – opens a window for configuring the audio display in the multiviewer window as a diagram – for more details, see the Audio monitoring setup section,

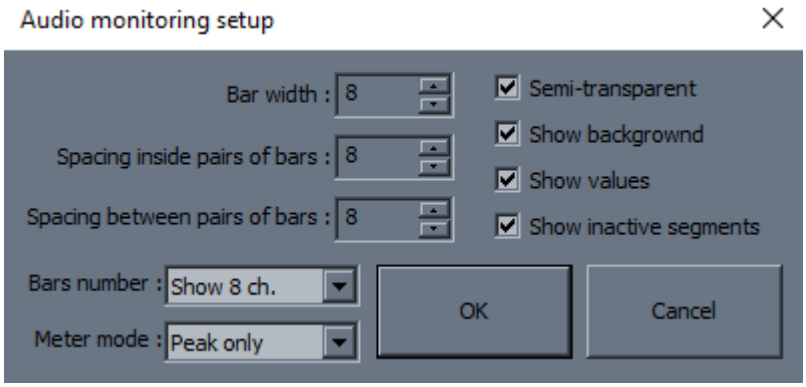
- *Layout* parameter – select the Multiviewer window layout from the drop-down list:

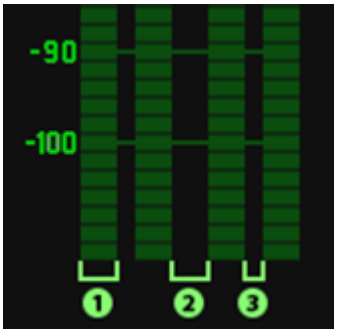


- *Always show project info* checkbox – enables/disables display of project information in the multiviewer interface,
- *Output format* parameter – selects the encoding and transmission method for the video signal:
  - *3G Level A* – direct encoding of data for 3G-SDI as a single output,
  - *3G Level B* – combines two 1.5G-SDI (Dual-Link) streams into a single 3G signal.

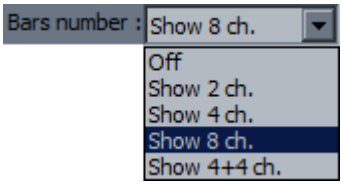
Audio monitoring setup

The Multiviewer allows you to display a peak sound level meter (PPM) for each channel overlay.
The PPM consists of bars, each of which displays the peak sound level of a single audio channel. The bars are divided into three zones: green (normal level), yellow (potential distortion), and red (distorted). Decibels (dB) can be displayed to the left of the bars.
The *Audio Monitoring Setup* window configures the PPM display parameters in the Multiviewer window.



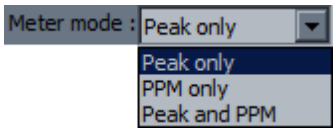


- The *Bar width* (in the figure on the right, 1), *Spacing inside pairs of bars* (in the figure on the right, 3) and *Spacing between pairs of bars* (in the figure on the right, 2) parameters change the format of the graphic display of audio tracks in the Multiviewer. The maximum parameter values are **8**.
- *Semi-transparent* checkbox – enable/disable semi-transparency of bars.
- *Show background* checkbox – enable/disable display of the background in the diagram window.
- *Show values* checkbox – enable/disable display of values.
- *Show inactive segments* checkbox – enable/disable display of bars in discrete format.
- *Bars number* parameter – select the number of audio channels to display from the drop-down list:



Selecting *Off* disables the PPM display.

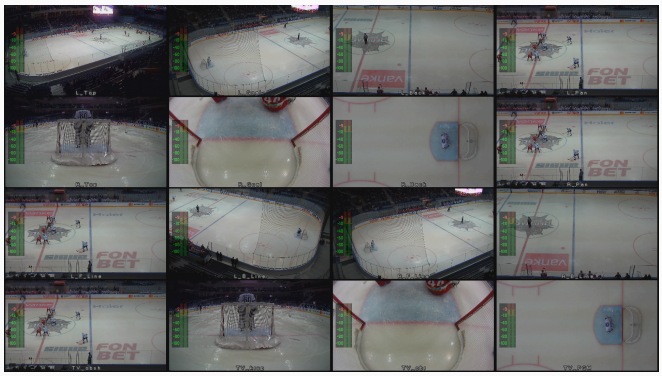
- *Meter mode* – select the chart display type from the drop-down list:

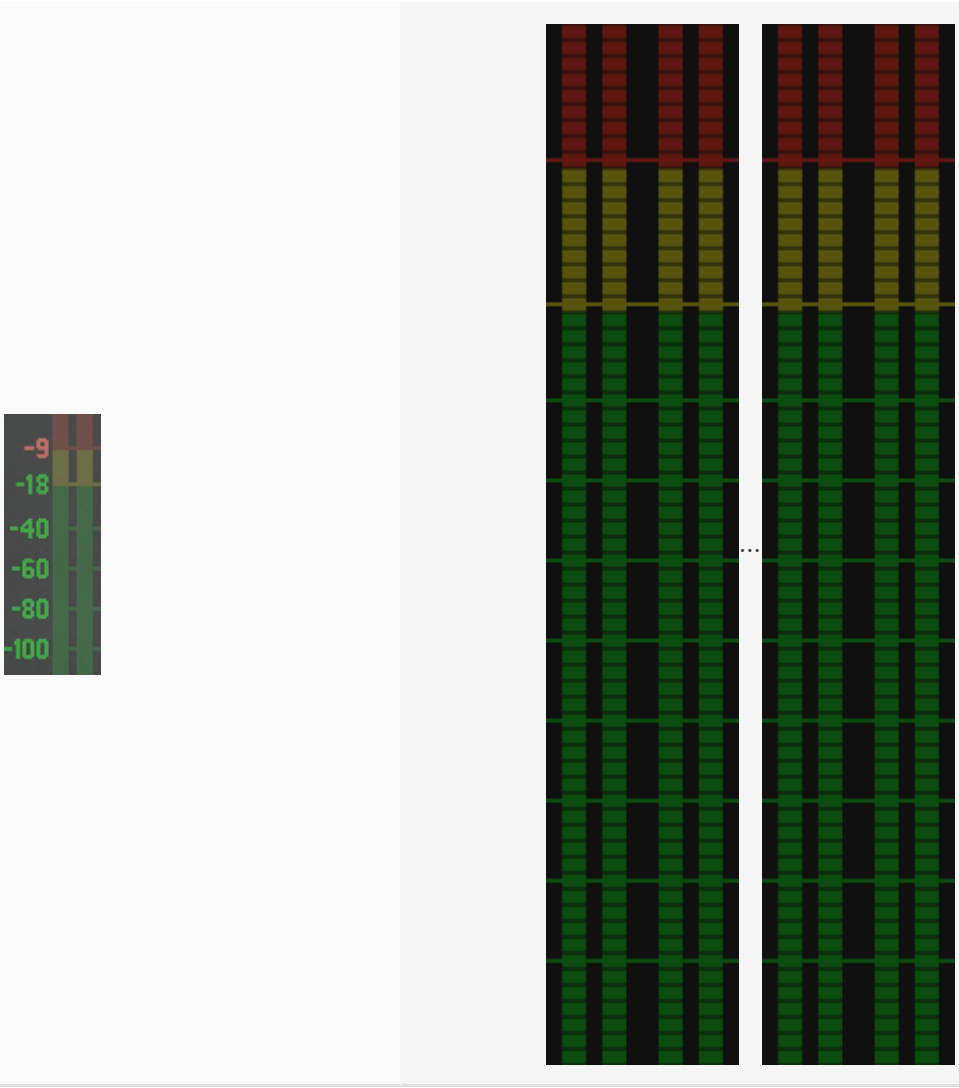


– *Peak only* – displays precise sound level peaks;
– *PPM only* – displays average sound level peaks;
– *Peak and PPM* – displays average sound level peaks along with precise peaks

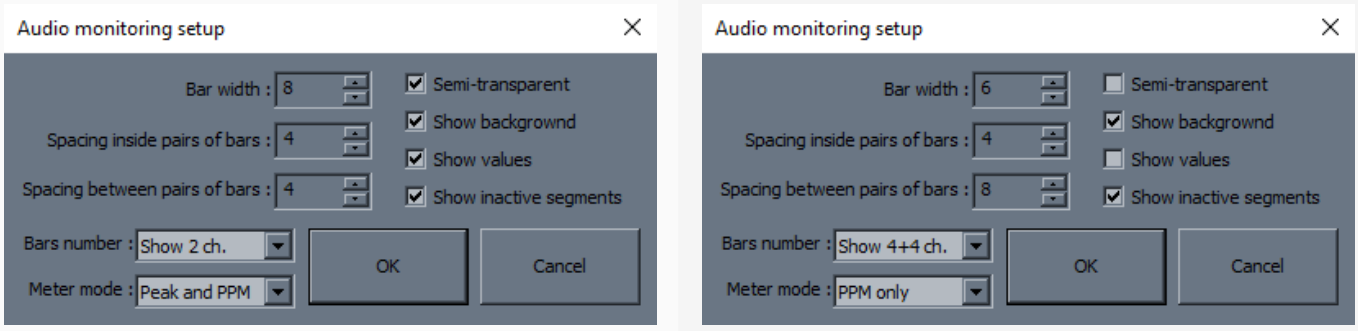
Changes to settings are applied to the display of audio tracks immediately.

Click **OK** to accept the changes and close the window, or **Cancel** to close the window without accepting the changes.
Below are examples of how audio tracks are displayed in the Multiviewer window:

Layout 4	*Layout 2*
	
Multiviewer window displaying **Audio monitoring**	



Displaying audio tracks on the Multiviewer



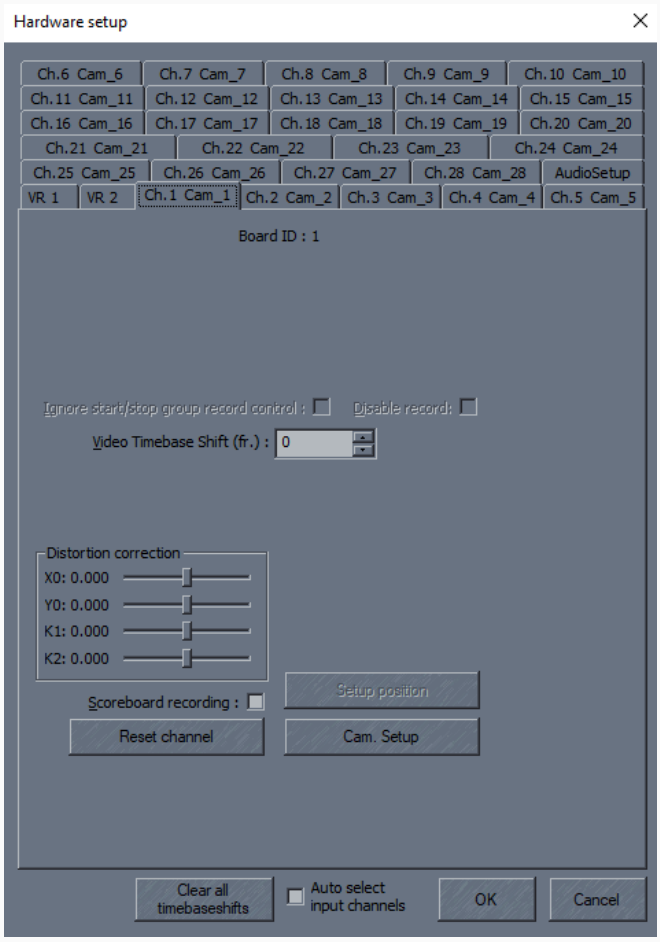
The displayed values

Figure 18 – Displaying audio tracks in the Multiviewer window

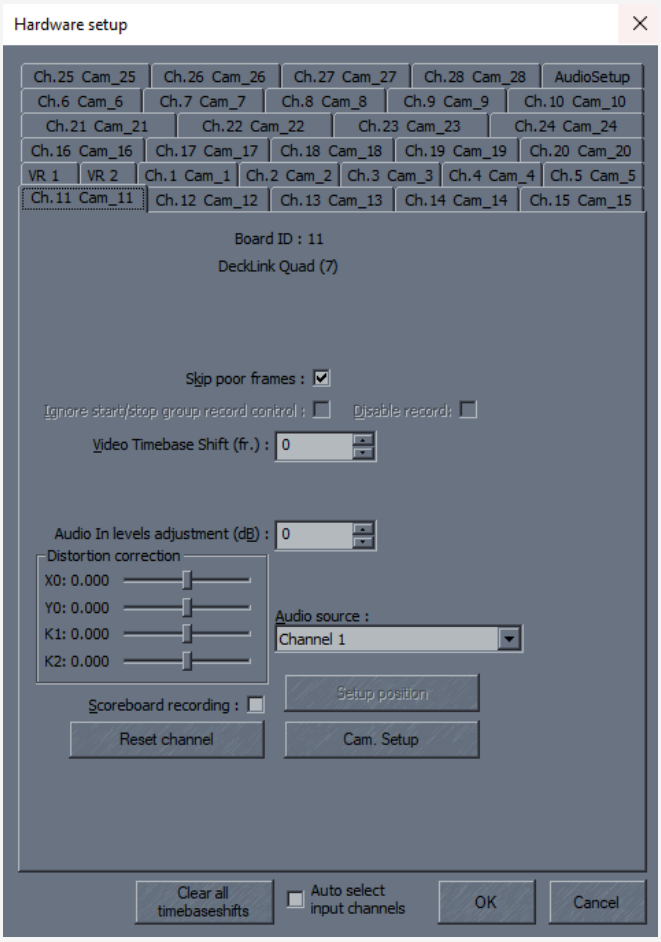
Ch... tabs

The *Ch...* tabs (figure 19) are used to configure parameters for each input video channel from the camera. The window may look like this:

Figure 19 – Setting up video channels



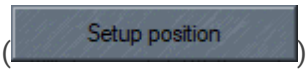
Setting up a channel without incoming audio

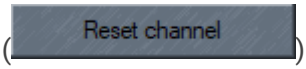


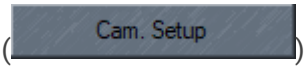
Setting up a channel with incoming audio

The availability of parameters in the window depends on the installed video card.

- At the top of the screen is the *Board ID* parameter – displays the channel's physical port ID.
- The *Skip poor frames* checkbox – enables/disables skipping of poor frames. If present, this parameter is checked by default.
- The *Ignore start/stop group record control* checkbox is available when configured without SSD drives. Checking this box disables recording of the selected channel during group control.
- The *Disable record* checkbox is available when configured without SSD drives. Checking this box disables recording of the selected channel.

- The *Video Timebase Shift (fr.)* parameter adjusts the video if there is a delay in any of the channels to ensure synchronicity across all channels. This value is specified in frames. The *Video Timebase Shift (fr.)* parameter is used in cases where long communication lines from external equipment connected to any of the inputs create time delays in video signal transmission.
  It is recommended to configure this parameter before starting video recording. If you make adjustments while recording video, increasing the shift value by one unit is equivalent to shifting the camera, i.e., inserting a blank (black) frame into the video for that channel to align time with the other channels. Decreasing the shift value by one unit, i.e., deleting one frame in the selected channel, is equivalent to inserting a blank (black) frame into the video to align time on all channels.
- *Audio In levels adjustment (-dB)* – adjusts the volume of the incoming audio signal.
- The *Distortion correction* field contains four sliders: *X0*, *Y0*, *K1* and *K2* for adjusting camera lens distortion. This parameter is used for live replays.
  - *X0* and *Y0*: shift the camera's optical center relative to the image center along the X and Y axes, respectively.
  - *K1* and *K2*: adjust the distortion coefficients.
- *Audio source* – selects which audio channel to use for a given video channel.
- *Scoreboard recording* checkbox – used to enable/disable the function of extracting the game scoreboard from the video coming from any of the cameras, recording it using a synchronous video channel, and displaying the recorded scoreboard using the PIP effect during video search and playback. This function can be useful in cases where a match controller is installed in the arena, from which, for some reason, it is impossible to obtain data using a direct connection. To obtain the image, any video channel with a clear image of the game scoreboard can be used. This can be a separate dedicated video channel[1] or any of the channels recording the game. The main thing is that the scoreboard is clearly visible on this channel and the angle does not change throughout the match.
- **Setup position** button (

) – used to adjust the scoreboard capture area when the *Scoreboard recording* feature is enabled. For more information, see the Scoreboard recording section.
- **Reset channel** button (

) – restarts the selected channel. Recommended only when no video is being received on the channel.
- **Cam. Setup** button (

) – opens the camera settings window (for slomo.tv cameras). For more information, see the Cam. Setup section.

Scoreboard recording

To adjust the size of the scoreboard capture area, click the **Setup Position** button (

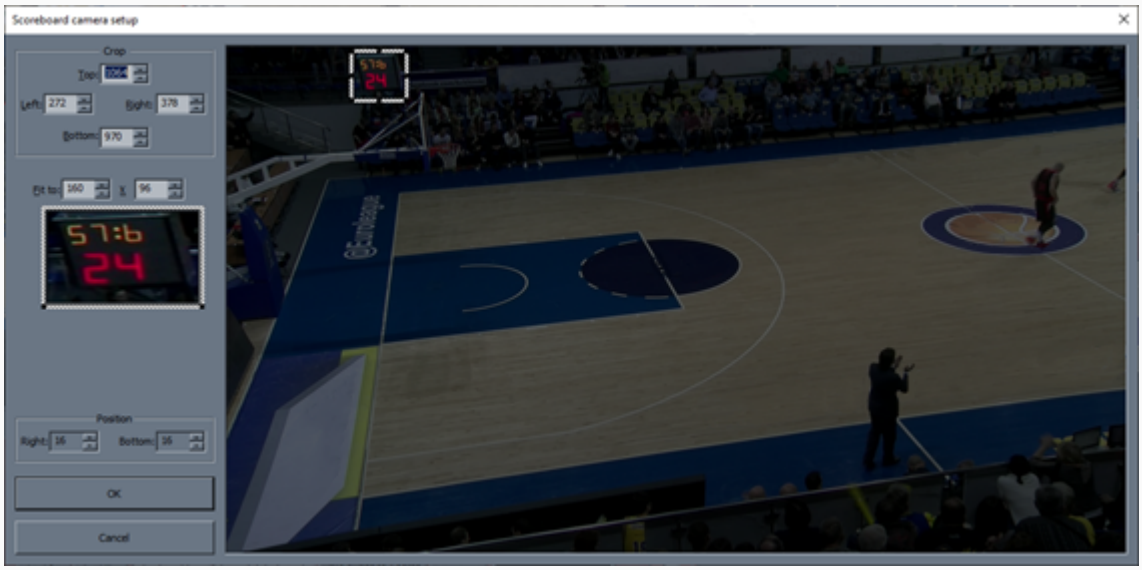
).
In the Scoreboard camera setup window that opens, configure the following:

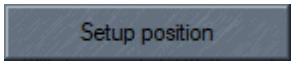
1. For video refereeing systems with a limited number of channels (videoReferee®-B, Jr., or videoReferee®-SR), there is a special option for connecting an additional video channel via a USB interface. With this option, any camera with an SDI or HDMI™ output, including a consumer camcorder, can be used.

- the position and size of the capture frame – *Crop*.
- the size of the display area – *Fit to*.

You can use your mouse for coarse adjustments, and for more precise positioning, use the buttons on the left side of the *Scoreboard camera setup* window.

Figure 20 – Example of setting up the display of the scoreboard



The image in the *Scoreboard camera setup* window matches the image in the channel when you clicked the 

button in the *Hardware setup* window.

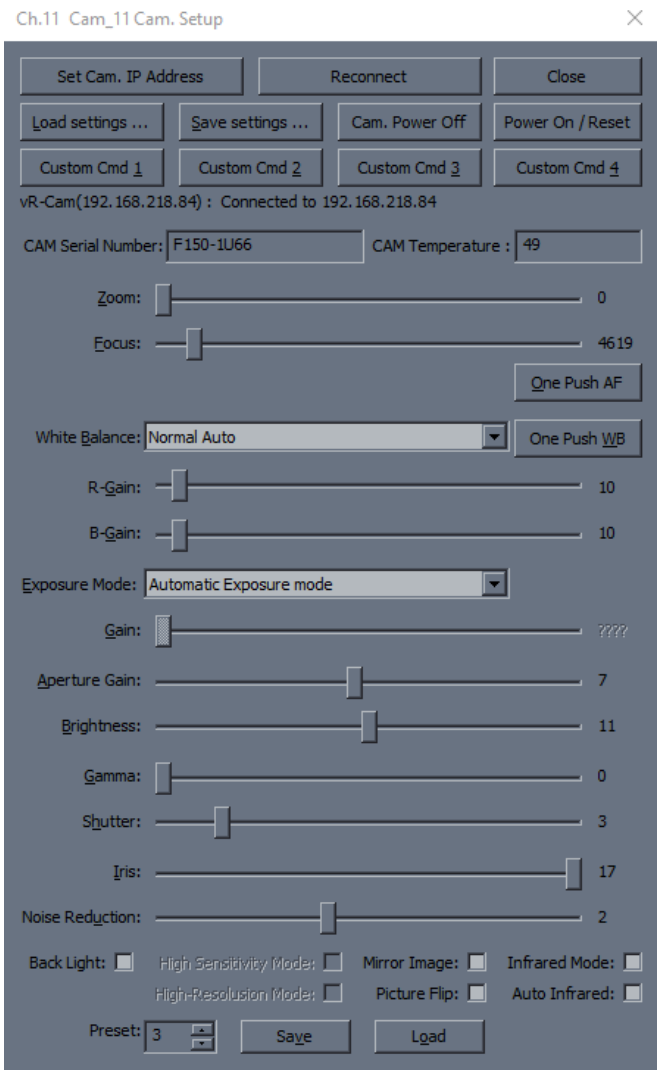
To save your settings, click **OK**.

> ⚠ Without clicking the **OK** button, the settings will not be saved!

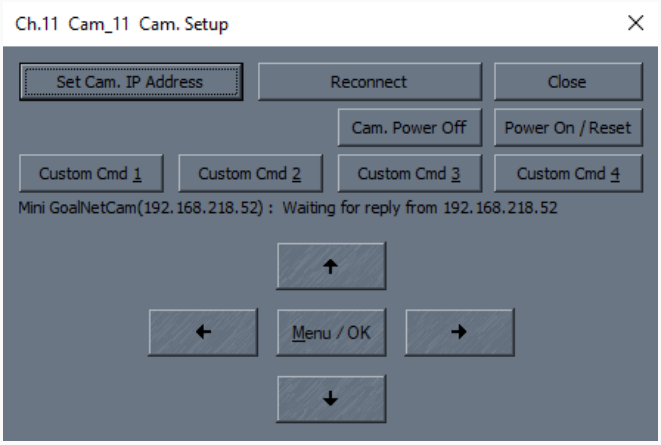
After closing the *Scoreboard camera setup* window, click **OK** in the *Hardware setup* window.
If configured correctly, the scoreboard image should appear in the recorded video.
If the scoreboard is not displayed, you may have game and mode information disabled (see the **Display** button in the control panel). For more information, see the "*videoReferee®* User Manual."

Cam. Setup

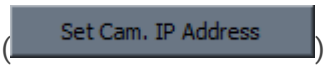
The Cam. Setup button is used to configure slomo.tv cameras. Clicking the button will open a window with adjustable camera settings. The setup window will vary depending on the selected camera type.



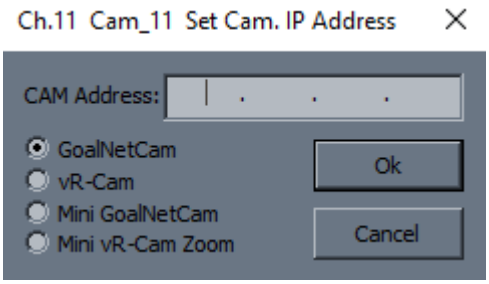
For *GoalNetCam*, *vR-Cam* and *Mini vR-Cam Zoom* cameras



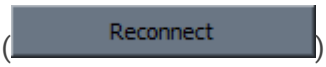
For *mini GoalNetCam* cameras

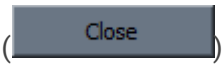
To select the camera to configure, click the **Set Cam. IP Address** button (

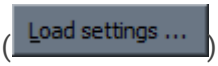
). A window will open:

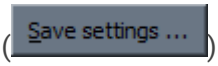


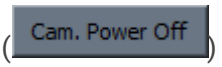
The *CAM Address* field is used to enter the IP address of the camera, and the list below on the left allows you to select the type of camera used.

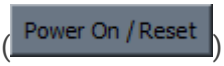
- The **Reconnect** button (

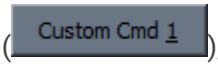
) reconnects to the camera if there are any interruptions.
- The **Close** button (

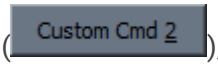
) closes the camera settings window.
- The **Load settings** (

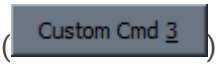
) and **Save settings** (

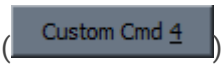
) buttons load existing camera settings from a file on the server or save the current settings to a file, respectively.
- The **Cam. Power Off** (

) button puts the camera into sleep mode.
- The **Power On/Reset** (

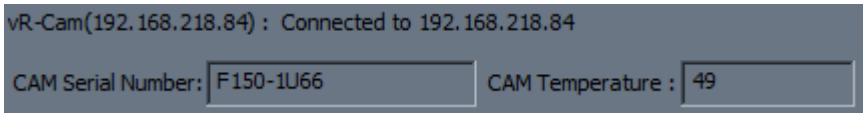
) button wakes the camera from sleep mode/reboots the camera.
- The **Custom Cmd 1** (

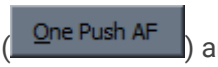
), **Custom Cmd 2** (

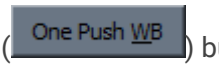
), **Custom Cmd 3** (

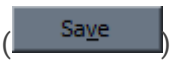
) and **Custom Cmd 4** (

) buttons are used to automate camera commands. For configuration, please contact technical support.
- The type, IP address, serial number and current temperature of the connected camera are listed below:

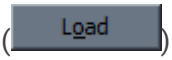


- The *Zoom* and *Focus* sliders adjust the camera's zoom and focus, respectively.
- The *White balance* parameter selects the white balance format from the drop-down list.
- **One Push AF** (

) and **One Push WB** (

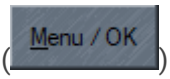
) buttons – enable autofocus and auto white balance, respectively.
- *R-Gain* and *B-Gain* sliders – adjust the red and blue color enhancements in the image, respectively.
- *Exposure Mode* – select an exposure mode from the drop-down list.
- *Aperture Gain*, *Brightness*, *Gamma*, *Shutter* and *Iris* sliders – control the amount of light reaching the camera sensor.
- *Noise Reduction* slider – adjusts image noise reduction.
- *Back Light* checkbox – enable/disable background illumination.
- *High Sensitivity Mode* checkbox – enable/disable high sensitivity mode. This option is unavailable by default.
- *High Resolution Mode* checkbox – enable/disable high resolution mode. This option is unavailable by default.
- *Mirror Image* checkbox – enable/disable horizontal image flipping.
- *Picture Flip* checkbox – enable/disable vertical image flipping.
- *Infrared Mode* checkbox – enable/disable infrared mode.
- *Auto Infrared* checkbox – enable/disable automatic infrared mode adjustment.
- *Preset* parameter – select a camera settings preset number for saving or loading.
- **Save** button (

) – save the settings to the selected camera preset.

- **Load** button (

) – load the camera settings from the selected preset.

For *mini GoalNetCam* cameras:

- **Menu / OK** button (

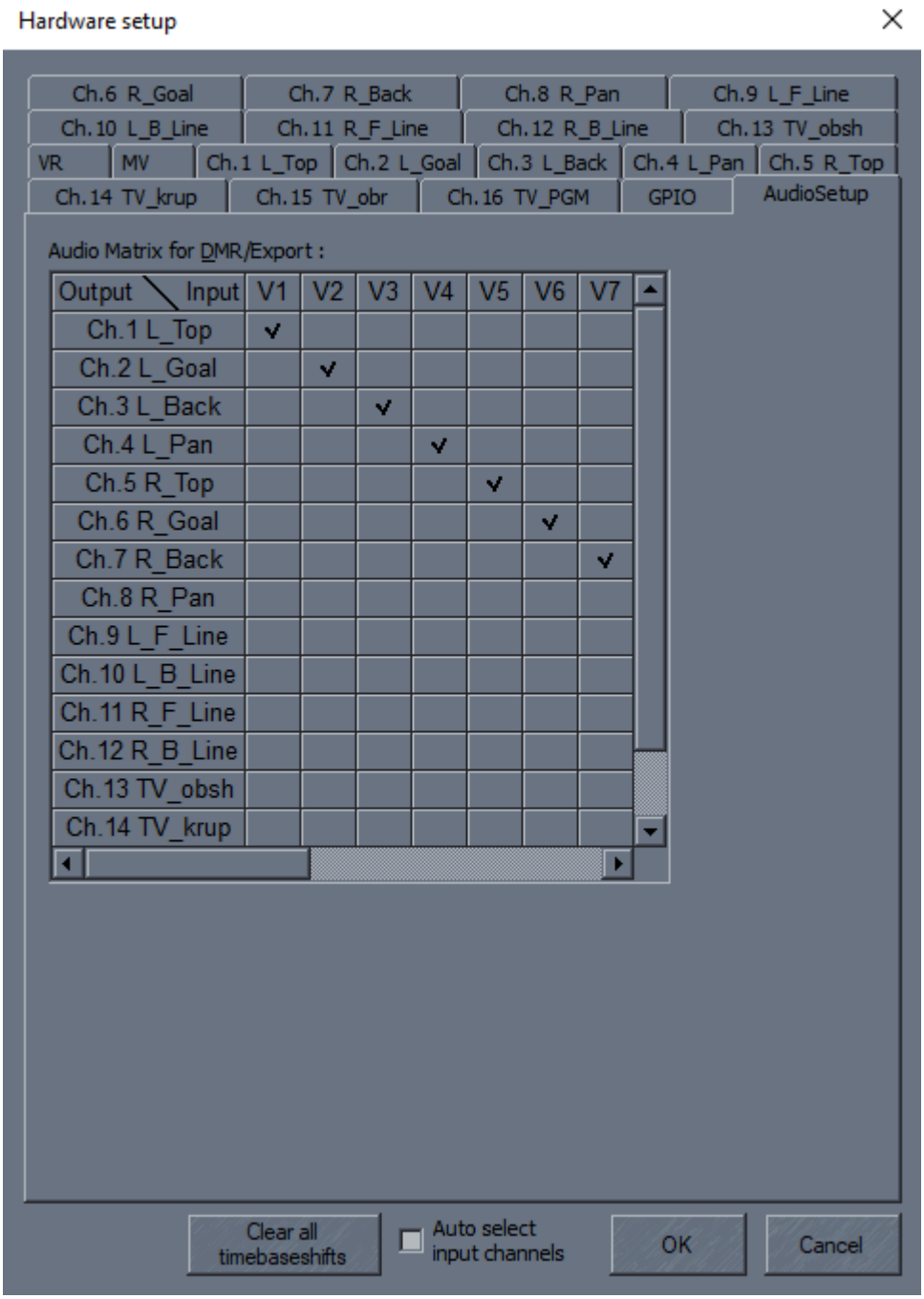
) – enters the camera setup menu.
- The  ,  ,  and  buttons – navigate the camera setup menu.

For more information on camera setup, see the "Setup and Control" guide.

AudioSetup tab

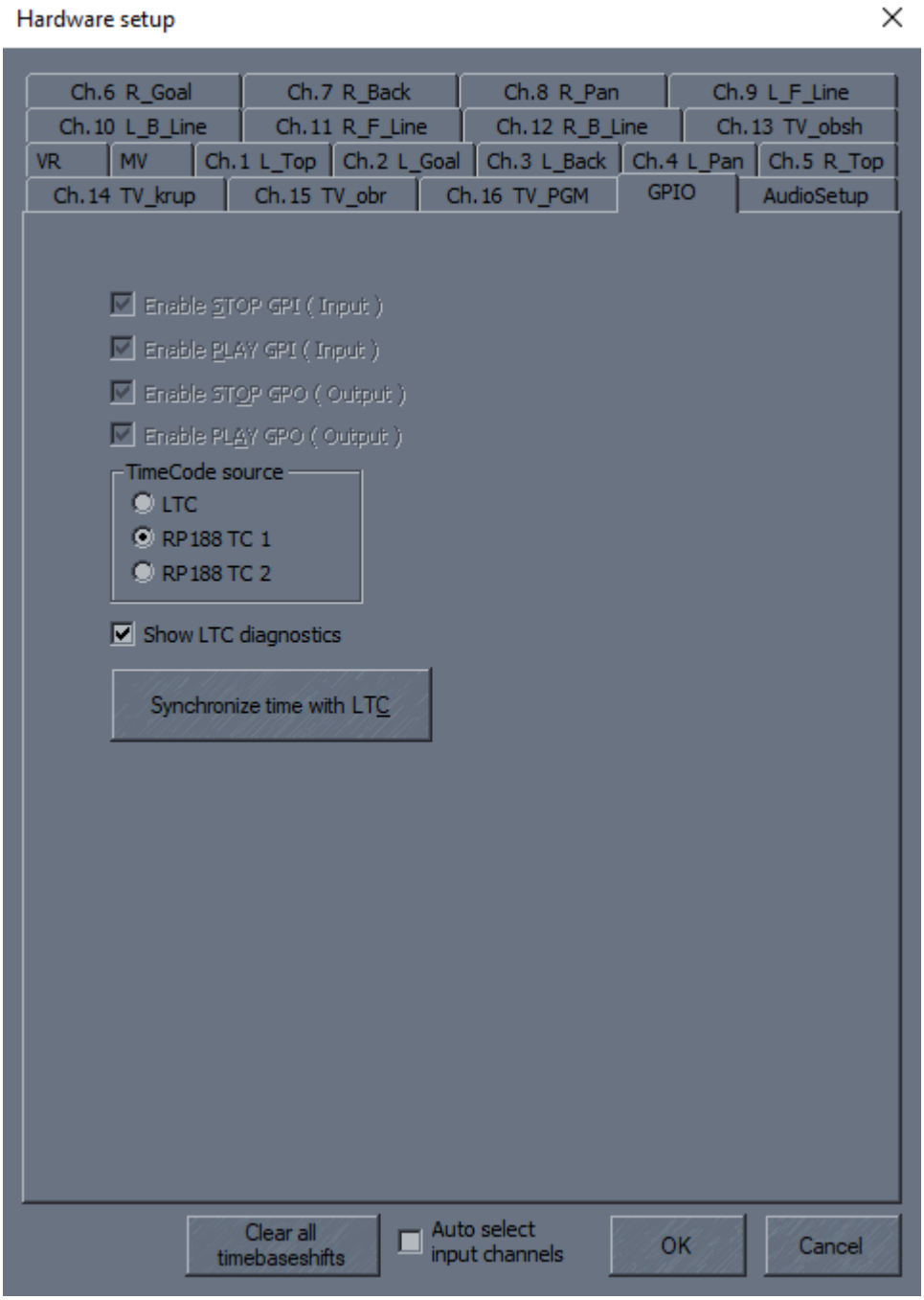
This tab is used to configure audio sources in exported video. It displays an audio signal matrix. This matrix is used to distribute recorded audio across channels for DMR™ media[1] and for export. Audio is recorded to the internal disk array on a one-to-one basis (what was received from the channel is what was recorded), while audio is recorded to DMR™ media according to the settings in this audio matrix. If an error is made while adjusting the matrix settings, the material can be exported later with new audio matrix settings.
The matrix rows indicate the available video channels, and the matrix columns indicate the audio signal sources. To assign the desired audio signal source to a video channel, check the corresponding intersection.

1. With an additional license.

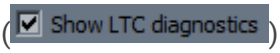


GPIO tab

The *GPIO* tab configures GPIO interface parameters. This interface can be configured as an input (*Enable STOP GPI (Input)*, *Enable PLAY GPI (Input)*) or an output (*Enable STOP GPO (Output)*, *Enable PLAY GPO (Output)*). Checking or unchecking the corresponding field enables or disables the selected GPIO interface parameter.

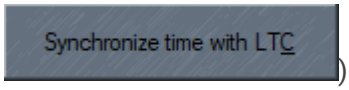


Also in this tab, you can configure the standard of the time code used (Time Code source): “*LTC*”, “*RP188TC 1*”, “*RP188TC 2*”.

The *Show LTC Diagnostics* (

) parameter displays the "*LTC*" line (timecode information) in the operating mode and exception message window.
The system has the ability to synchronize the system time with a connected external timecode source. To

synchronize the system time with an external timecode source, click the **Synchronize time with LTC** (

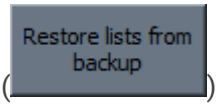


) button in the GPIO tab. Since the program uses the system time as the timecode source when an external timecode source is unavailable, using this button allows you to continue working with the desired timecode value even if the external timecode source is unavailable (cable break, disconnection). Clicking the **Synchronize time with LTC** button immediately initiates the synchronization command. If a timecode is received, the system time will immediately synchronize with the received timecode, and this action cannot be undone. If the time code is missing for any reason, the program will wait for the time code to arrive either until it appears, or until the synchronization command is canceled using the

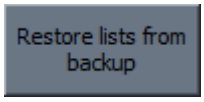
button, or until the settings dialog is closed.

Restore list from backup

Clicking the **Restore list from backup** button (



) initiates loading the list of highlighted gameplay moments from the backup.
Video and service information already written to disk at the time of the hardware failure are guaranteed to survive the failure. However, to ensure quick project loading, the list of highlighted gameplay moments will not be loaded automatically. It will only be loaded upon explicit request from the video engineer by clicking the



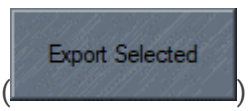
button.

If the list of tagged moments is valuable for further work, it must be uploaded immediately after downloading the project. Otherwise, the disk space it occupies will be overwritten by a new list of tags, and to create a video log, you will have to review the entire match recording and re-tag.

Export Selected

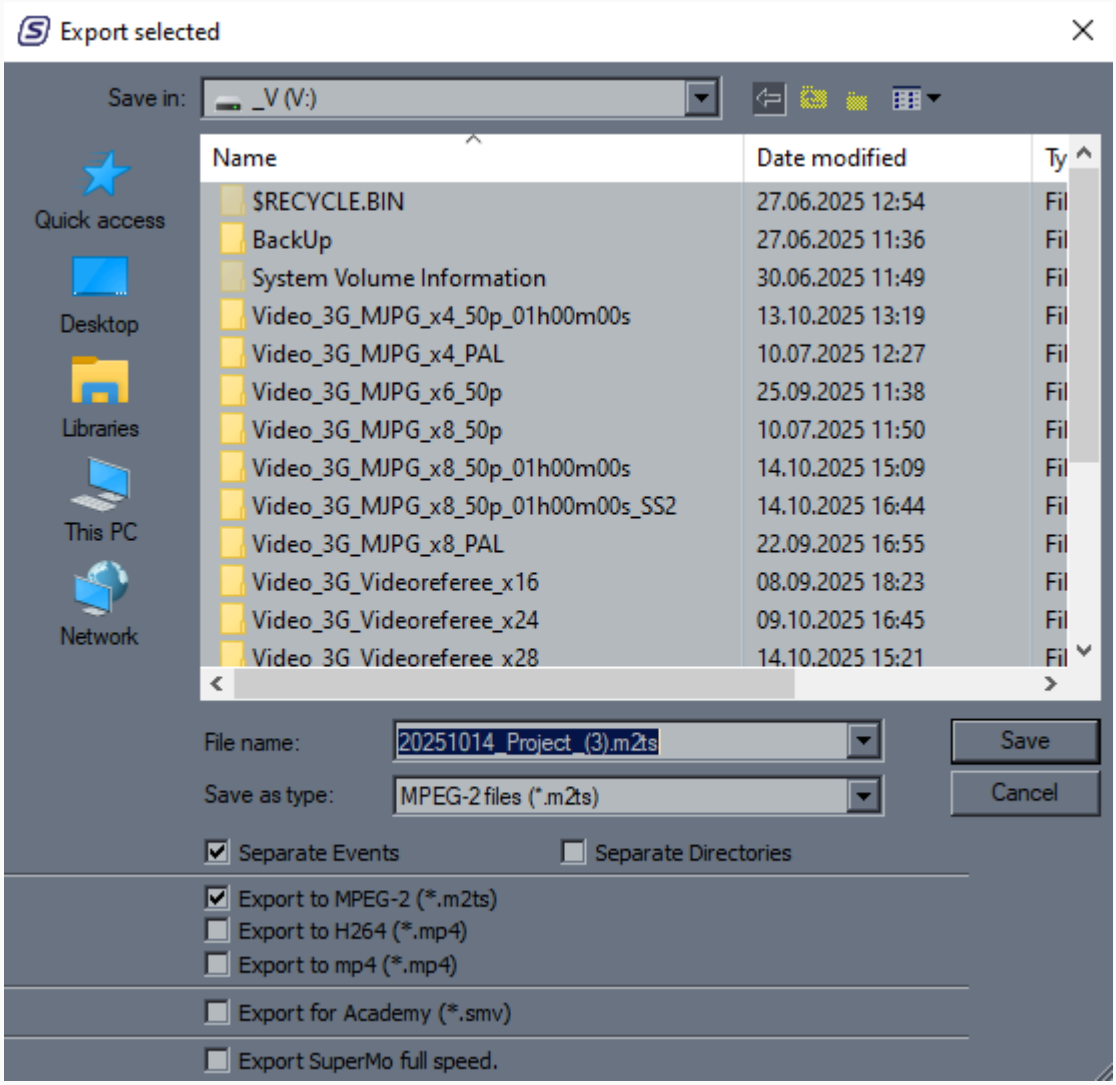
The *Export Selected* section of the *Tools* menu allows you to export selected events to an ***.mp4** or ***.m2ts** file in HD quality. The file created during the export process includes a 3-second introductory screen displaying event information and has no subtitles; match information is burned directly into the video.

Clicking the **Export Selected** button (



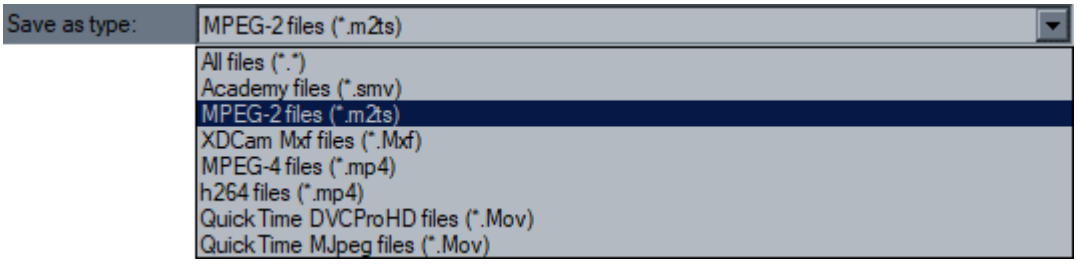
) in the *Tools* menu opens the *Export Selected* window, shown in figure 21.

Figure 21 – Export Selected window



In this window, you configure export settings, specify the file save location and specify the file name. When exporting, you can specify the following file parameters:

- File save location (drive and folder);
- File name. By default, this is the name of the current project;
- File type (Save as type):



- Separate Events – check if you want to create separate video files for each marked moment. If an event has multiple cameras, they will all be in a single file;
- Separate Directories – if enabled, files in each format are organized into subdirectories. By default, directories are named m2ts, h264, mp4, mxf, and smv, with the recording date appended to these names.
- Select a codec for saving:

Export to MPEG-2 (***.m2ts**)	Good-quality video files, small size (but larger than H264), fastest export process
Export to H264 (***.mp4**)	High-quality video files, small size, slowest export process
Export to mp4 (***.mp4**)	Video files with the lowest image quality, smallest size

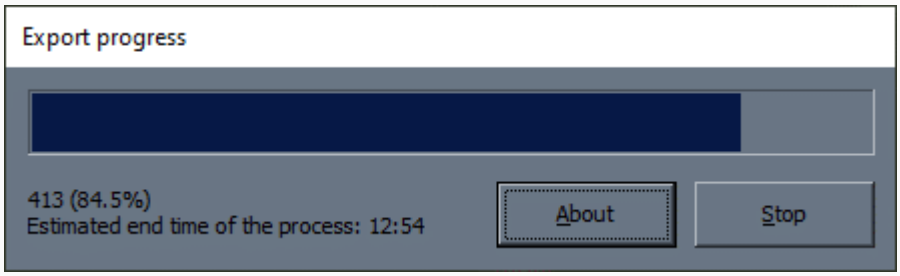
To select multiple codecs simultaneously, use the **Ctrl** key + the codec selection. However, if Separate Directories is unchecked, only one of the following two codecs will be selected:
– Export to H264 (***.mp4**);
– Export to mp4 (***.mp4**).

- Export for Academy – exports video in a specialized format for use on Academy training servers.
- Export SuperMo full Speed – select this option if you want to export video from high-speed SuperMotion cameras without the slow-motion effect, at normal speed. Extra frames from SuperMotion cameras will be discarded. Without this option, video from SuperMotion cameras will be exported at a slower speed proportional to the speed of the camera used.

After entering the parameters, click **Save**.

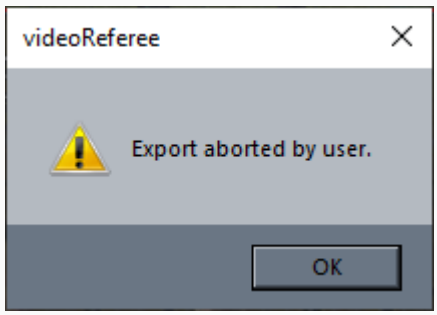
During the export process, a progress window (figure 22) will open, displaying the operation's progress. If necessary, you can interrupt the operation by clicking the **Stop** button (figure 22). Once the export is complete, the progress window will close automatically and a message will be displayed indicating that the export operation is complete (figure 23b).

Figure 22 – Export Selected operation progress window

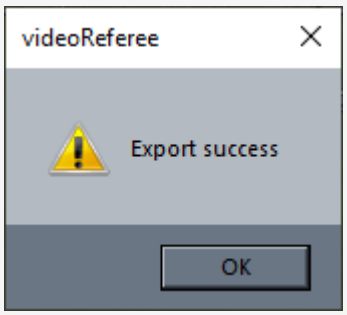


If you interrupt the export process, the existing file will not be deleted automatically. If it is no longer needed, you must delete it manually.

Figure 23 – Completing the export



a) Export interrupted by user



b) Successful completion of export

Click **OK**.

All exported moments are placed in a folder with a name consisting of the selected codec and the current date. For example, *m2ts_2023_02_07*.
The created file will have a name consisting of:

- Project name;
- Period number;
- Game time;
- Mark time.

For example: *Test_P1_T29_54__D17_48_13.m2ts*.

For each moment, the created video file is preceded by a 3-second intro displaying technical information:

– Server name and serial number; – Export date; – Recording date; – Project name; – Recording start time.	

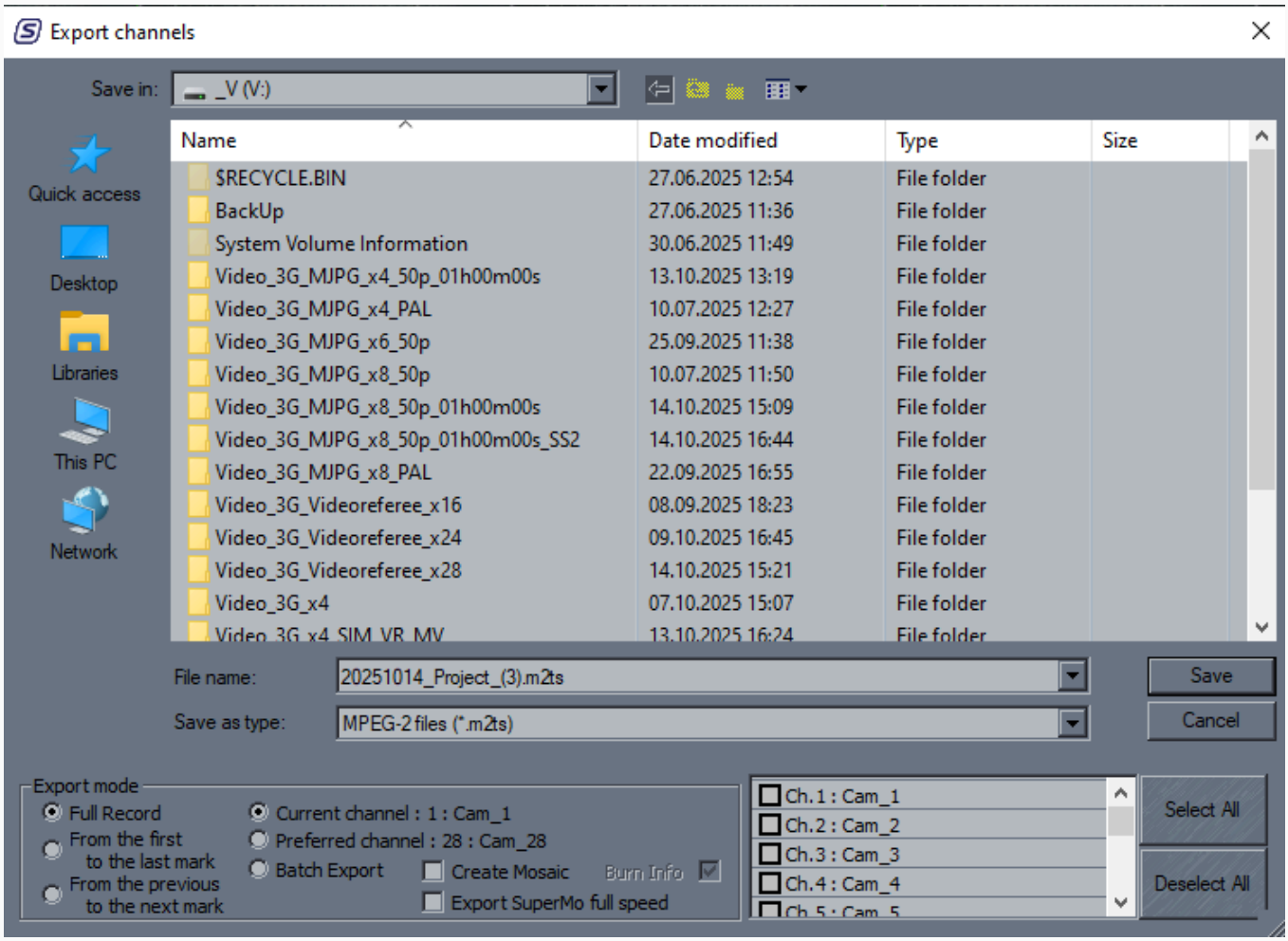
Export channels

The *Export channels* section of the *Tools* menu allows you to export video for one, several or all channels.

Export the selected channel

To export, select the channel (make it active) from which you want to export video. Then open the menu: **Tools (**  **)** → **Export channels**.
The export window shown in figure 24 will open.

Figure 24 – Export channels window



In this window, specify the following parameters for the created file:

- Save file location (drive and folder) – Save In;
- Save file name – File name. By default, this is the name of the current project;
- Save file type (***.mp4**, ***.m2ts**, ***.Mxf**) – Save as type:

- In the Export mode settings, select the duration of the segment to export:
  - Full Record – export from the beginning to the end of the recording;
  - From the first to the last mark – export from the first to the last mark;
  - From the previous to the next mark – export from the previous to the next mark.

- In the Export mode settings, select Current channel:
- Export SuperMo full Speed – select this option if you want to export video from high-speed SuperMotion cameras without the slow-motion effect, at normal speed. Extra frames from SuperMotion cameras will be discarded. Without this option selected, video from SuperMotion cameras will be exported at a slower speed proportional to the speed of the camera used.

After entering the parameters, click **Save**.

During the export process, a progress window will open (figure 22), displaying the progress of the operation. Once the export is complete, the progress window will close automatically and a message will be displayed confirming the export is complete (figure 23b).
Once the export is complete, a file will be created with a name consisting of:

- project name
- channel number
- channel name
- recording start time
- export date.

For example, *Test_1_L_Top_17_28_12_04__07.Feb.2023.m2ts*.

The created video file is preceded by a 3-second intro, which displays technical information:

– Server name and number;
– Export date;
– Recording date;
– Project name;
– Recording duration;
– Recording start time;
– Channel number.

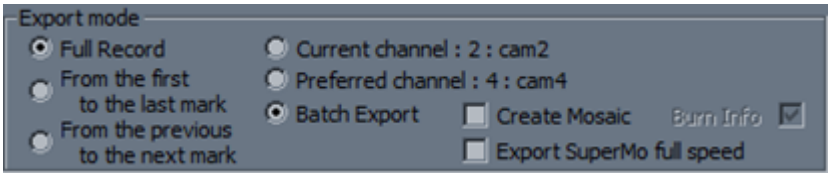
Batch export

To export multiple or all channels at once, the program offers a batch export option. To perform a batch export, open the menu: **Tools** () → **Export channels**.
The export window shown in figure 24 will open.

In this window, specify the following parameters for the created file:

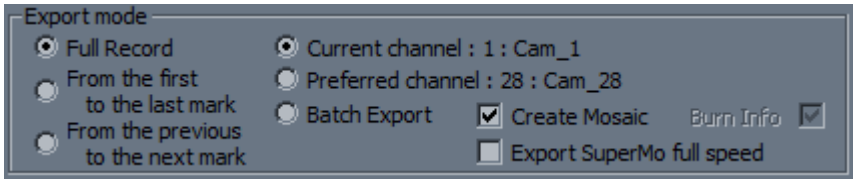
- File save location (drive and folder) – Save In;
- File name. By default, this is the name of the current project;
- File type (***.mp4**, ***.m2ts**, ***.Mxf**) – Save as type:

- In the Export mode settings, select the duration of the segment to export:
  - Full Record – export from the beginning to the end of the recording;
  - From the first to the last mark – export from the first to the last mark;
  - From the previous to the next mark – export from the previous to the next mark.
- In the Export mode settings, select Batch Export:



- Select channels for export – all (Select All) or only the necessary ones – by checking/unchecking:

- To create a separate video file containing all/selected channels simultaneously, placed on one screen, check the *Create Mosaic* checkbox:

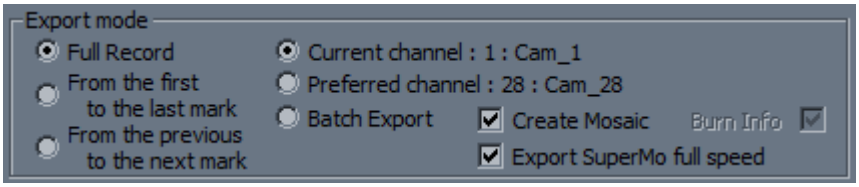


A video created using *Create Mosaic* allows you to play all exported channels simultaneously on a single screen. The created video file will have a name consisting of:

- project name;
- the word "mosaic";
- recording start time;
- export date.

For example: *Test_Mosaic_18_11_36_01__07.Feb.2023.m2ts*.

- Export SuperMo full Speed – select this option if you want to export video from high-speed SuperMotion cameras without the slow-down effect, at normal speed. Extra frames from SuperMotion cameras will be discarded. Without this option, video from SuperMotion cameras will be exported at a slower speed proportional to the speed of the camera used.



Once you've entered the parameters, click **Save**.

During the export process, a progress window (figure 22) will open, displaying the operation's progress. Once the export is complete, the progress window will close automatically, and a message will be displayed indicating the export is complete (figure 23b).

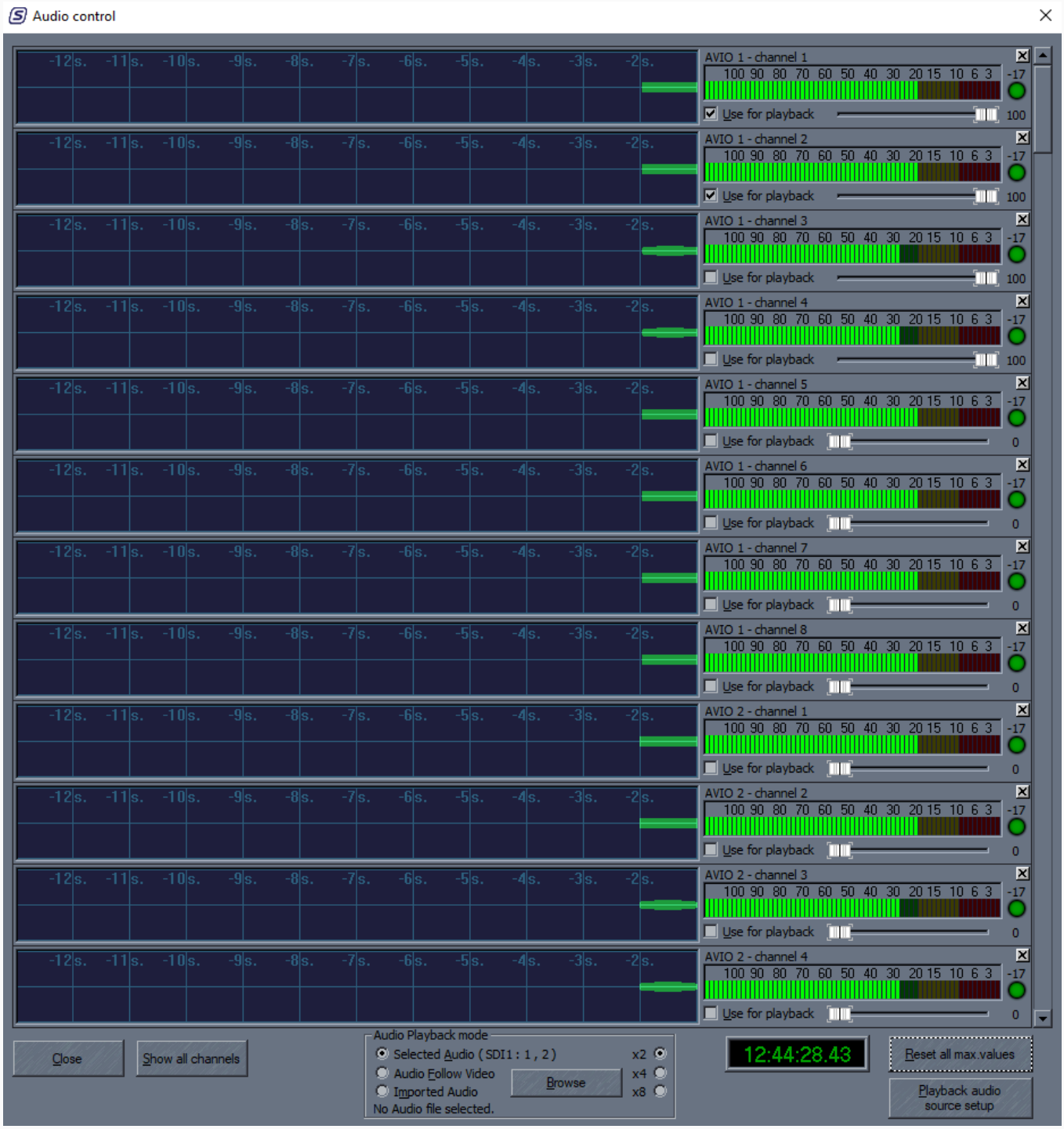
Once the export is complete, files will be created with names consisting of:

- project name,
- channel number,
- camera name.

Audio panel

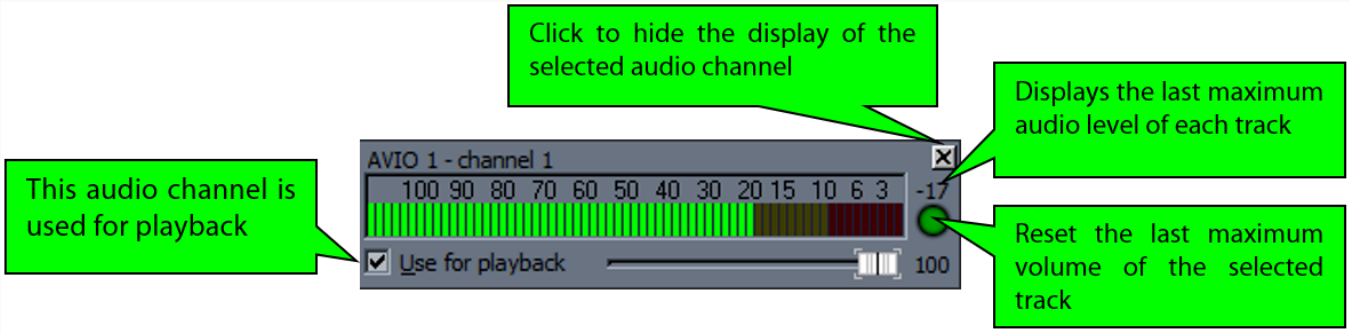
To open the audio panel (figure 25), in the main program window click the  button on the toolbar or press the key combination **Ctrl + Shift + A** on the keyboard.

Figure 25 – Audio panel



Initially, the audio panel displays all audio channels the system can handle. Each video channel can support up to eight audio tracks. However, this number of audio tracks is not always fed to the system input. Typically, audio is fed to only a few video channels, not all. For ease of use, you can disable the display of unused audio tracks. To do this, click the ☒ button in the mnemonic diagram window for the corresponding audio track (figure 26).

Figure 26 – Soundtrack mnemonic diagram

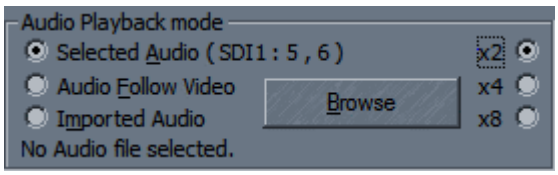


To restore the display of all audio channels, click the **Show all channels** button (Show all channels) in the lower left corner of the window.
Each audio track's mnemonic diagram displays a maximum audio level indicator. To reset the audio levels, use the **Reset all max. values** button (Reset all max.values) located in the lower right corner of the window. This resets all previously displayed audio level values for all audio channels.
If you want to use an audio channel for playback, check the *Use for playback* box (Use for playback).

> ⚠ The "*Use for playback*" parameter is used in pairs, i.e. the mark will be placed in the selected and the next audio channel (two audio tracks will be used) and, therefore, it is necessary to ensure that these audio tracks match.

Selecting an audio source

The Audio Playback mode field at the bottom of the window provides a choice:

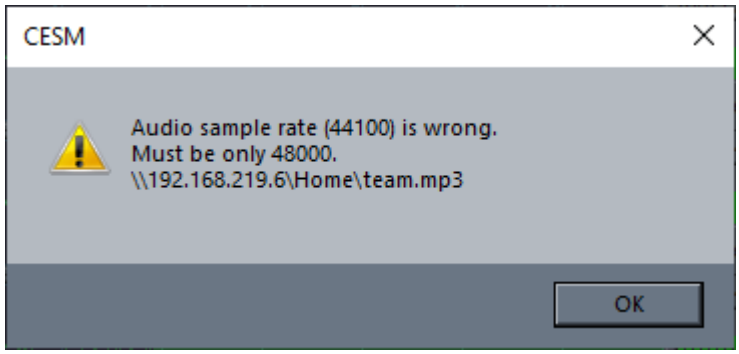


- *Selected Audio* – plays selected audio channels. This means that when switching video channels, audio from the selected channels will always be used, not from the video channels. The audio channel used for playback is marked by checking the box *Use for playback* (Use for playback) in the audio track mnemonic diagram window;
- *Audio Follow Video* – plays audio from the channel on which the corresponding video was recorded. When switching the video channel, the audio channel of the selected video channel will also be switched for playback.

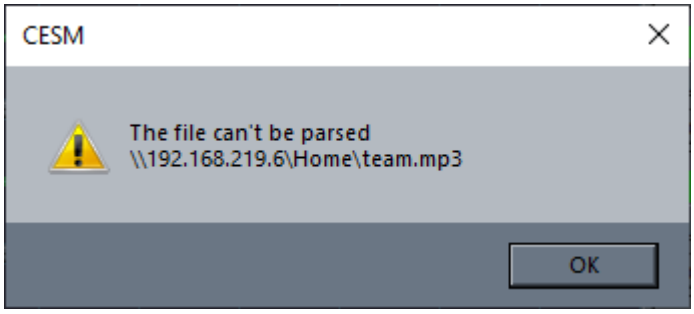
- *Imported Audio* – plays an external ***.mp3** file. Select the file by clicking the **Browse** button. The selected file must have a frequency of 48 kHz.
  The imported audio must be located on the same drive as the program (drive C:\ or V:). If the audio file is located elsewhere, an error message about accessing the audio file will appear the next time the program is restarted.

When using imported audio that does not meet the requirements, the following error messages may occur:

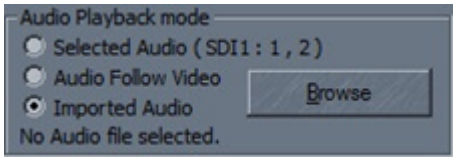
- Opening a file with an incorrect frequency:



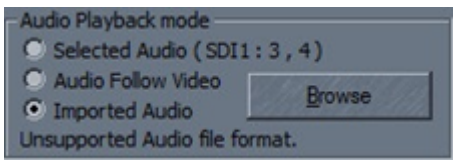
- Opening a file of the wrong format:



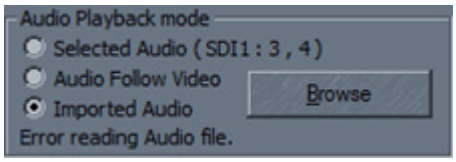
- «*No Audio file selected*» – The audio file used previously was not found.:



- «*Unsupported Audio file format*» – the audio file format used is not supported by the system (the audio file frequency does not match the required one):



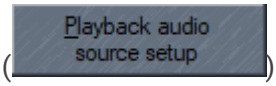
- «*Error reading Audio file*» – error reading audio file:



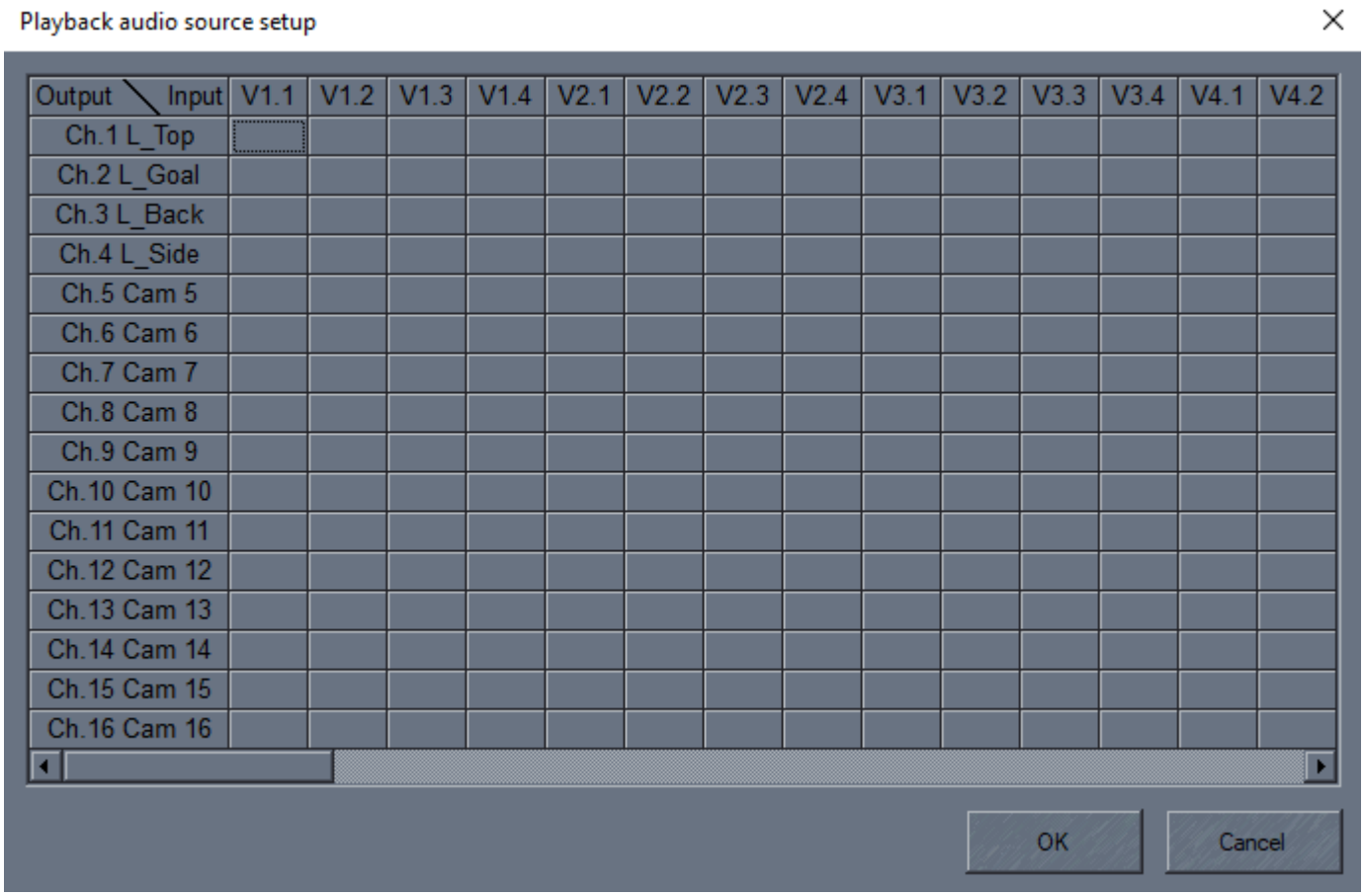
It is important to specify the sound source correctly, otherwise there may be no sound during playback.

To select the number of channels to play, use the switch (on the right) in the Audio Playback mode field: (x2, x4, x8).
When receiving a mono audio signal, the audio is duplicated across two tracks. When receiving a stereo audio signal, the incoming stereo signal is used.

Fixed binding of playback channel to input

The **Playback audio source setup** button (

) opens a window for linking the video channel to the audio channel:



In this window, the user can link the playback channel to the input channel.
The following conventions are used to designate audio sources:

- **V** – audio embedded in the input video channel will be used;
- **A** – audio coming via the AES/EBU interface;
- **MC** or **MO** – audio coming via the MADI interface (C – coaxial, O – optical).

The combination of video channels and audio sources is set by clicking on the corresponding intersection.

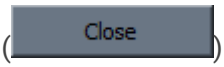
The numbers following the source type indicate the source number and the pair within it. For example:

- "*V5.4*" indicates embedded audio in SDI of the 5th video channel of the 4th pair (tracks 7 and 8);
- "*V6.3*" indicates embedded audio in SDI of the 6th video channel of the 3rd pair (tracks 5 and 6);
- "*A2.1*" indicates the AES/EBU audio of the 5th pair (tracks 9 and 10).

By default, this window does not have any presets.

> ⚠ Setting up audio channels is not an easy task. It is recommended to do this before starting recording.

Closing the Audio panel

To exit the *Audio Panel*, click the **Close** button (

) or  . All audio settings you've made are saved automatically.

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slomo.tv software products are constantly evolving. Therefore, there may be discrepancies between the documentation and the implemented functionality.
To ensure we can send you an updated version of the documentation, please notify slomo.tv technical support of any discrepancies, incompleteness, or other issues you may discover in this manual by email at support@slomo.tv.