



Elecard XMuxer Lite

User Guide

Version 1.4

Notices

Elecard XMuxer Lite User Guide

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CONTENTS

1.INTRODUCTION	4
1.1 PREFACE.....	4
1.2 DESCRIBING ELECARD XMUXER LITE.....	5
1.2.1 Specifications.....	5
1.2.2 Features.....	8
1.3 USING THIS GUIDE.....	9
1.3.1 Purpose.....	9
1.3.2 Topics Covered.....	9
1.4 SYSTEM REQUIREMENTS.....	10
1.5 LICENSING AND TECHNICAL SUPPORT.....	10
2.GETTING STARTED	11
2.1 INSTALLING ELECARD XMUXER LITE.....	11
2.2 UNINSTALLING ELECARD XMUXER LITE.....	11
2.3 RUNNING ELECARD XMUXER LITE.....	12
3.USING ELECARD XMUXER LITE	13
3.1 DESCRIBING ELECARD XMUXER LITE GUI.....	13
3.1.1 Hot Keys.....	14
3.2 XMUXER LITE SETTINGS.....	15
3.2.1 General Settings.....	15
3.2.2 Hot Keys Settings.....	16
3.3 XMUXER LITE BASIC OPERATIONS.....	18
3.3.1 Remultiplexing files.....	18
3.3.2 Demultiplexing files.....	20
3.3.3 Multiplexing files.....	21
4.HOW TO	23
4.1 TRIM MPEG STREAM.....	23
4.2 CREATE FILE FOR DVD RECORDING (FROM MULTIPROGRAM TS).....	25
4.3 CREATE TRANSPORT STREAM FOR ATSC BROADCASTING.....	25

1. Introduction

1.1 Preface

Elecard XMuxer Lite is an audio/video editing program designed for prosumers. It supports all popular formats like MPEG-1 System Stream, MPEG-2 Program Stream (including SVCD and DVD), MPEG-2 Transport Stream, MP4 (Sony PSP, ISMA, iPod), AVI (DV, XviD, DivX, 3ivX).

Elecard XMuxer Lite allows the user to preview video and audio content with the indexing possibility for accurate stream positioning, to multiplex video and audio elementary streams, and provides GOP-accurate trimming without re-encoding and quality loss, and many other functions.

Elecard XMuxer Lite includes the following components:

Table 1. Elecard XMuxer Lite Components

Component	File Name	Description
Elecard MPEG-2 Video Decoder	em2vd.ax	DirectShow filter for software-only real-time decoding of MPEG-2 (ISO/IEC 13818-2) and MPEG-1 (ISO/IEC 11172-2) video streams. Provides high resolution, full quality decoding, optimized for the most efficient CPU usage.
Elecard MPEG-4 Video Decoder	em4vdec.ax	DirectShow filter for software-only real-time decoding of MPEG-4 SP-ASP (ISO/IEC 14496-2) video streams.
Elecard AVC Video Decoder	eavcdec.ax	DirectShow filter for software-only real-time decoding of AVC/H.264 video (MPEG-4 P.10 ISO/IEC 14496-10) video streams.
Elecard AAC Decoder	eaacd.ax	DirectShow filter for software-only real-time audio decoding of AAC streams.
Elecard MPEG Audio Decoder	emad.ax	The Elecard Audio Decoder filter enables the software-only decoding of MPEG-1, MPEG-2, MPEG-2.5, LPCM audio streams.
Elecard MPEG Demultiplexer	empgdmx.ax	DirectShow filter for software-only splitting of MPEG-1 System Streams (ISO/IEC 11172-1), MPEG-2 Program Streams (ISO/IEC 13818-1) or MPEG-2 Transport Streams (ISO/IEC 13818-1), PVA streams into video and audio streams.
Elecard Stream Parser	empgdmx.ax	DirectShow filter for software-only splitting of audio streams (AC-3, AAC etc.).
Elecard MPEG Multiplexer	mpegmux.ax	DirectShow filter that provides the MPEG-2 Transport Stream (TS) or MPEG-2 Program Stream (PS) generation.
Elecard MP4 Demultiplexer	emp4demux.ax	DirectShow filter that provides demultiplexing of ISO/IEC 14496-14 file format (MP4) and

Component	File Name	Description
		3GPP2 System streams into a MPEG-4, H.263, AVC/H.264 video streams and AAC, AMR, MPEG-1/2 Audio Layer 3 audio streams.
Elecard Indexator	Elmpgindexator.dll	MPEG Indexator is a COM object that allows an application to create an index file for MPEG audio/video files.
Elecard IndexReader	elmixreader.dll	MPEG Indexreader is a COM object that allows an application to read indexed files.
Elecard Sink Filter	esf.ax	DirectShow filter that dumps a stream to a file.
Elecard XMuxer Engine	EXMuxEngine.dll	XMuxer Engine is a COM object that allows an application to multiplex and demultiplex streams according to the user interface prepared script.

Note: Elecard AVC Video Decoder and Elecard AAC Decoder are included into the additional package (Elecard AVC PlugIn).

The GOP-accurate AVI trimming function is available if the AVI Trimmer PlugIn from Solveig Multimedia is installed (see <http://www.solveigmm.com/?Products&id=AVITrimmerCOM>).

1.2 Describing Elecard XMuxer Lite

The following section defines specifications and features of Elecard XMuxer Lite. It includes definitions and descriptions of the supported stream formats.

1.2.1 Specifications

Remultiplexing mode:

Supported Input formats:

- MPEG-1 video stream
- MPEG-2 video stream
- MPEG-1 audio stream
- MPEG-2 audio stream
- AC-3 audio stream
- AAC audio stream (with ADTS headers)
- MPEG-1 System Stream
- MPEG-2 Program Stream
- MPEG-2 Transport Stream

- AVC/H.264 video stream
- MPEG-4 (Part 2) video stream
- MP4 file
- AVI file

Output formats:

- MPEG-2 Program Stream
- MPEG-2 Transport Stream
- AVI file

Demultiplexing mode:

Supported Input formats:

- MPEG-1 System Stream
- MPEG-2 Program Stream
- MPEG-2 Transport Stream
- MP4 file
- AVI file

Output formats:

- MPEG-1 video stream
- MPEG-2 video stream
- AVC/H.264 video stream
- MPEG-4 video stream
- MPEG-1 Audio Layer (I, II, III) (ISO/IEC 11172-3)
- MPEG-2.5 audio stream
- MPEG-2 audio stream
- LPCM Linear PCM (an audio standard for DVD)
- AC-3 audio stream

- AAC audio stream (with ADTS headers)

Multiplexing mode:

Supported Input formats:

- MPEG-1 video stream
- MPEG-2 video stream
- AVC/H.264 video stream
- MPEG-4 video stream
- MPEG-1 Audio Layer (I, II, III) (ISO/IEC 11172-3)
- MPEG-2.5 audio stream
- MPEG-2 audio stream
- LPCM Linear PCM (an audio standard for DVD)
- AC-3 audio stream
- AAC audio stream (with ADTS headers)

Output formats:

- MPEG-2 Program Stream
- MPEG-2 Transport Stream

A Transport Stream can consist of the following streams:

- ✓ MPEG-1 video stream
- ✓ MPEG-2 video stream
- ✓ AVC/H.264 video stream
- ✓ MPEG-4 (Part 2) video stream
- ✓ MPEG-1 audio stream
- ✓ MPEG-2.5 audio stream
- ✓ MPEG-2 audio stream
- ✓ MPEG-2 program stream

- ✓ AC-3 audio stream
- ✓ AAC audio stream (with ADTS headers)

A Program Stream can consist of the following streams:

- ✓ MPEG-1 video stream
- ✓ MPEG-2 video stream
- ✓ AVC/H.264 video stream
- ✓ MPEG-4 (Part 2) video stream
- ✓ MPEG-1 audio stream
- ✓ MPEG-2.5 audio stream
- ✓ MPEG-2 audio stream
- ✓ LPCM Linear PCM (an audio standard for DVD)
- ✓ AC-3 audio stream
- ✓ AAC audio stream (with ADTS headers)

A MP4 file can consist of the following streams:

- ✓ AAC audio stream (with ADTS headers)
- ✓ MPEG-4 (Part-2) video stream
- ✓ AVC/H.264 video stream

Note: Previewing AC-3, MPEG-1 L3, MPEG-2, MPEG-2.5 and LPCM audio streams is available only if corresponding decoder is installed in the system.

1.2.2 Features

Elecard XMuxer Lite has the following features:

- Previewing the selected streams
- Remultiplexing only the selected (marked) streams
- High definition video multiplexing/demultiplexing
- Seek forward and Seek backward options
- GOP-accurate MPEG-2, MPEG-4, AVC/H.264 trimming

- GOP-accurate AVI (DV, XviD, DivX, 3ivX, etc) trimming
- Stream indexing
- Ability to open the index files created previously
- MP4 files support
- T-STD compatible streams output support
- Program Specific Information (PSI) editing
- Ability to adjust the audio-video synchronization in the **Remux** and **Mux** modes (**Initial Time Shift** option)
- Auto rewind after the playback stop
- Ability to edit the hot keys

Note: The GOP-accurate AVI trimming function is available if the AVI Trimmer PlugIn from Solveig Multimedia is installed (see <http://www.solveigmm.com/?Products&id=AVITrimmerCOM>).

1.3 Using this Guide

1.3.1 Purpose

This guide is intended to help you view and edit video files using Elecard XMuxer Lite. It describes XMuxer Lite GUI, settings and functions and provides instructions for using the application.

1.3.2 Topics Covered

- **Section 1: Introduction** – provides a general overview of Elecard XMuxer Lite and describes the purpose of the document and its contents.
- **Section 2: Getting Started** – describes how to install, uninstall and run Elecard XMuxer Lite.
- **Section 3: Using Elecard XMuxer Lite** – describes XMuxer Lite GUI and provides instructions for XMuxer Lite basic operations such as remultiplexing, demultiplexing and multiplexing files.
- **Section 4: How to...** – describes how to perform most common operations.

1.4 System Requirements

Software Requirements

- Windows® 2000/XP/2003 Server/Vista

Hardware Requirements

- SSE-enhanced CPU (Intel® Pentium III, Celeron, AMD® Athlon, Opteron etc.)
- 128 MB RAM
- Any VGA card
- About 10 MB of free disk space

1.5 Licensing and Technical Support

Elecard XMuxer Lite is available as shareware or as a registered product. The shareware version has a time limit of 10 minutes for the duration of output streams. The registered version includes a registered Elecard MPEG2 Video Decoder.

By installing, copying, or otherwise using the SOFTWARE PRODUCT or any UPDATES, you agree to be bound by the terms of the "Elecard" End-User License Agreement ("EULA"). This EULA is a legal agreement between you (either an individual or a single entity) and Elecard for the "Elecard" software product(s) accompanying this EULA, which include(s) computer software and may include "online" or electronic documentation, associated media, and printed materials ("SOFTWARE PRODUCT").

For sales and licensing information contact the Elecard sales department:

sales@elecard.net.ru

For technical support, please contact the Elecard Technical Support Team:

tsup@elecard.net.ru

2. Getting Started

The following section details the procedures for installing and running Elecard XMuxer Lite.

2.1 Installing Elecard XMuxer Lite

1. Download the evaluation version or the registered version.
2. Run *Elecard XMuxer Lite Setup*.
To run, unzip and run the application *Elecard XMuxer Lite.exe*.
3. The **Elecard XMuxer Lite setup** window will appear. Read the recommendations and warnings. Click **Next**.
4. The **Release Notes** will appear with information about the current version of the program. Click **Next**.
5. The **License Agreement** will appear. Read the agreement and if you accept the terms within, check the **Yes I agree with the terms of this license agreement** check box. Click **Next**.
6. Activate Elecard XMuxer Lite (follow the onscreen instructions).
7. Select the installation folder in which you want to install Elecard XMuxer Lite. To select an installation folder, click **Browse** and find the folder in which you would like to install Elecard XMuxer Lite. Click **Next**.
8. Select program group. Click **Next** twice.
9. To complete installation, follow the onscreen instructions.
When setup has finished installing all of the necessary files on your computer, the '*Elecard XMuxer Lite has been successfully installed*' message appears, and the program is ready to run. You do not need to reboot your computer. Select **Run Registrator** check box. Click **Finish**.
10. The *Registrator* program is started. Click **Activate** and type the serial number in the corresponding field. Click **OK**.

2.2 Uninstalling Elecard XMuxer Lite

To uninstall Elecard XMuxer Lite accomplish the following instructions:

1. Click *Start-->Programs--> Elecard --> Elecard XMuxer Lite-->Uninstall Elecard XMuxer Lite*.

2. To remove the application, select **Uninstall Elecard XMuxer Lite** option button.
3. Follow the onscreen instructions to complete the removal of Elecard XMuxer Lite.

2.3 Running Elecard XMuxer Lite

To run Elecard XMuxer Lite click *Start-->Programs--> Elecard--> Elecard XMuxer Lite--> Elecard XMuxer Lite*.

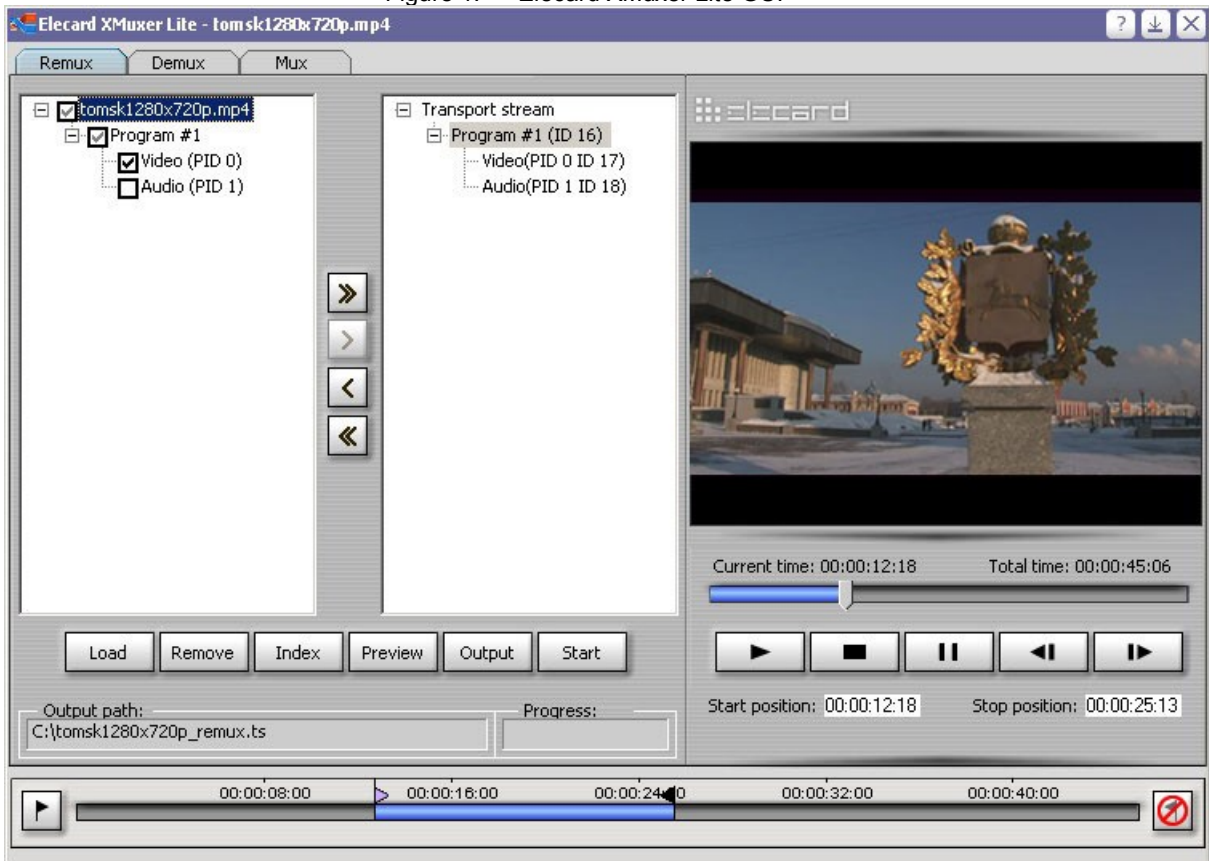
3. Using Elecard XMuxer Lite

The following section describes XMuxer Lite GUI (graphic user interface), its features, and gives instructions for XMuxer Lite basic operations.

3.1 Describing Elecard XMuxer Lite GUI

The following section describes, in detail, XMuxer Lite features and controls.












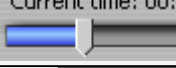



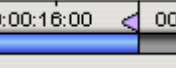




Figure 1. Elecard XMuxer Lite GUI



The following table describes each button and its function.

Table 2. Elecard XMuxer Lite GUI Description

Button	Function
Input streams box <input checked="" type="checkbox"/> Program# 1 <input checked="" type="checkbox"/> H264 Video (ID 224 @ Prog# 1)	Allows the user to select streams from all available for preview.


Button		Function
 Load		Selects an input media file and loads it.
 Remove		Removes the loaded stream from the input list.
 Index		Creates the index file.
 Preview		Turns on the preview mode for selected streams.
 Output		Opens a folder where a resulting file will be saved.
 Start		Makes a resulting file.
 Play		Starts playback of a file from the current position.
 Stop		Stops playback of a file.
 Pause		Pauses playback of a file.
 Step Backward by Frame		Rewinds a movie backward by frame.
 Step Forward by Frame		Rewinds a movie forward by frame.
 Pointer		Marks the current playback position.
 Set Position flag		Sets the position flag for trimming.
 Delete Position flag		Removes the position flag for trimming.
 Start Position flag		Marks the start position for trimming.
 Stop Position flag		Marks the end position for trimming.
 Start/Stop Time Position		Sets the time interval for trimming.
Add All, Add, Remove and Remove All buttons 		Adds/removes streams to/from the output stream.
Help 		Opens the Help file.
		Closes the XMuxer Lite program and file.

3.1.1 Hot Keys

The following table describes all the hot keys available for Elecard XMuxer Lite users.

Table 3. Elecard XMuxer Lite Hot Keys



Default Hot Key	Description
CTRL+O	Selects the input file.
CTRL+T	Selects the output file.
CTRL+I	Creates the index file.
CTRL+R	Removes the loaded stream from the input list and unloads it.
CTRL+P	Previews the selected streams.
F5	Starts/stops the work process.

Default Hot Key	Description
ALT+P	Toggles between play/pause.
ALT+ RIGHT ARROW	Step Forward.
ALT + LEFT ARROW	Step Backward.
CTRL+ RIGHT ARROW	Adds the selected stream.
Delete	Removes the selected stream from the input list.
SPACEBAR	Selects/deselects input streams.
APPLICATION Key 	Displays the selected stream menu.
CTRL+F	Shows the current playback graph.
CTRL+S	Shows Settings dialog.
CTRL+~	Toggles between modes.
CTRL+Q	Closes the program.
CTRL+M	Sets current position to the next marker on timeline and displays the marked frame in Preview window.

3.2 XMuxer Lite Settings

The following section describes the XMuxer Lite **Settings** window.

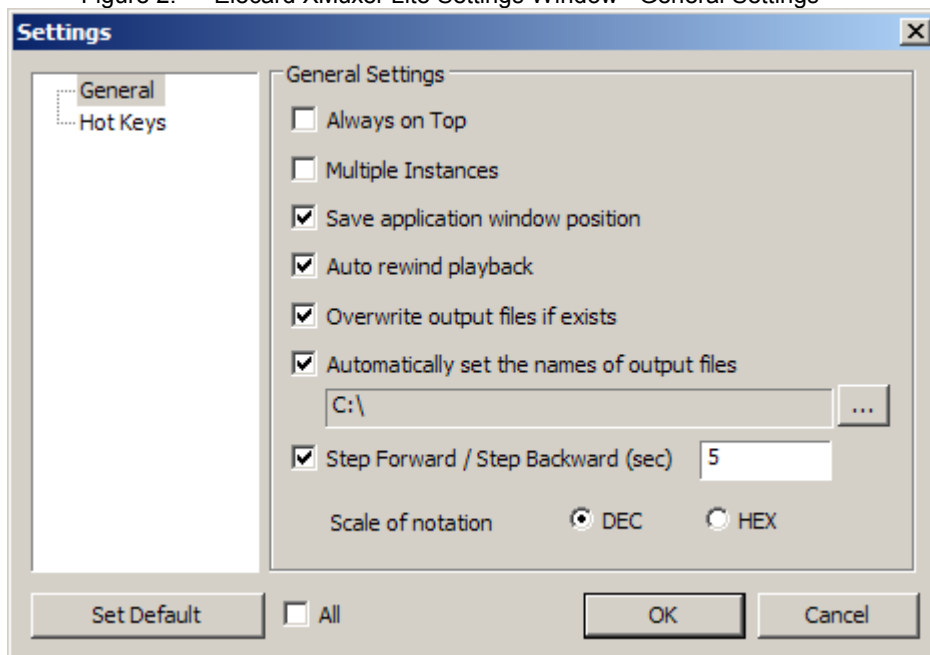
To open the **Settings** window, press **Ctrl+S** or select **Settings** in the system menu.

To set default settings for the selected page, click the **Set Default**  button. To restore all application settings to its default values, select the **All** **All** check box and click the **Set Default**  button.

3.2.1 General Settings

To adjust the basic settings, click **General** in the **Settings** window.

Figure 2. Elecard XMuxer Lite Settings Window - General Settings



The following table defines the **General Settings** options:

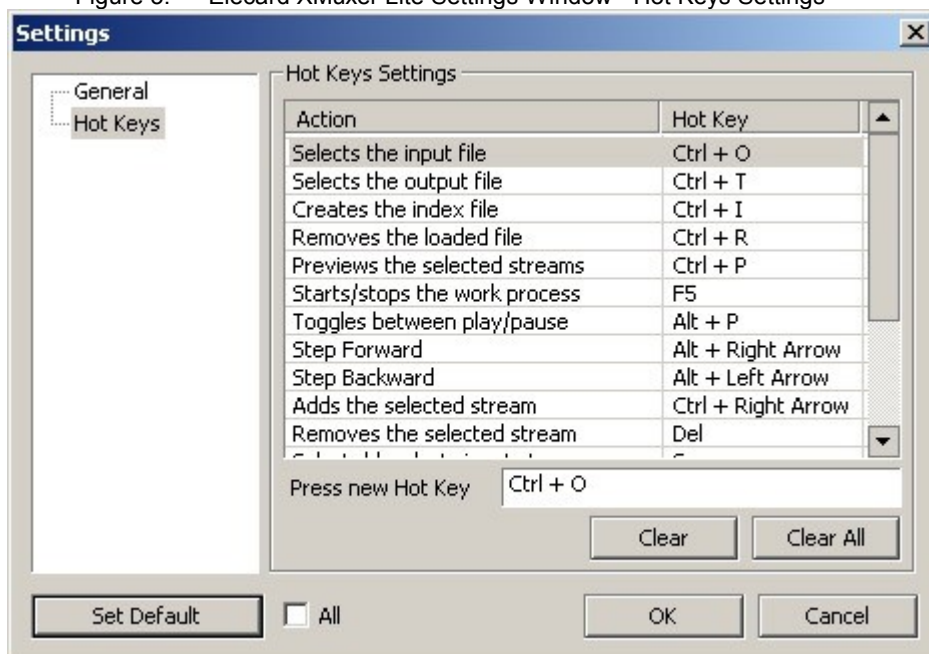
Table 4. General Settings Options

Settings	Description
Always on Top	If the box is selected, the XMuxer Lite window is always displayed above all other windows.
Multiple Instances	If the box is selected, the multiple XMuxer Lite instances are allowed.
Save application window position	If the box is selected, the XMuxer Lite window position is saved automatically.
Auto rewind playback	In Stop mode, rewinds playing position to the beginning of the stream.
Overwrite output files if exists	If the box is selected, the output file will be overwritten.
Automatically set the names of output files	If the box is selected, names of output files will be set automatically in all modes. There is also an option to select the folder for saving the output files.
Scale of notation	<ul style="list-style-type: none"> ● DEC Parameter values (StreamID, ProgramID, etc.) are presented as decimal numbers. ● HEX Parameter values (StreamID, ProgramID, etc.) are presented as hexadecimal numbers.
Step Forward / Step Backward (sec)	If the box is selected, stream positioning in the Preview window is performed by time steps (not by frames). The time step value is set in seconds.

3.2.2 Hot Keys Settings

To open the **Hot Keys Settings** pane, click **Hot Keys** in the **Settings** window. The **Hot Keys Settings** pane allows viewing and setting Hot Keys to invoke XMuxer Lite functions.

Figure 3. Elecard XMuxer Lite Settings Window - Hot Keys Settings



To change Hot Keys combination, select an action which should be performed by a Hot Key in the **Hot Keys Settings** pane. Then type a new key combination in the **Press new Hot Key** box. New Hot Key appears in the column **Hot Key** of the **Hot Keys Settings** pane.

- New Hot Keys can also be set using the **Press new Hot Key** box shortcut menu.

- To save new Hot Keys, click **OK** or **Apply**.
- To restore the default Hot Keys, click **Set Default**.
- To delete the applied Hot Key, select the corresponding Action and click **Clear**.
- To delete all the Hot Keys, click **Clear All**.

3.3 XMuxer Lite Basic Operations

3.3.1 Remultiplexing files

To remultiplex files follow the instructions below:


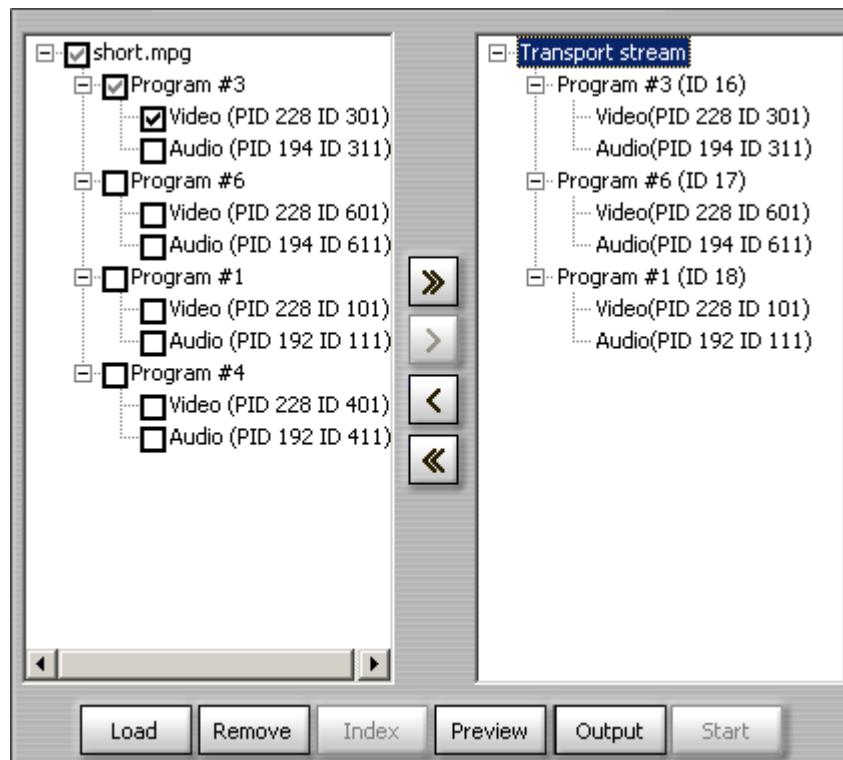




1. Start XMuxer Lite by clicking “*Elecard XMuxer Lite*” from the **Start** menu or double-clicking the *XMuxer Lite* icon.
2. Click **Load** .
3. Select the folder and then the file you want to remux. Open the file by clicking the **Open** button or double-clicking the file name. Select streams to remultiplex. You can preview only one video stream simultaneously.

Figure 4. Remux Mode Dialog Box



4. To preview the selected streams click the **Preview**  button.

The following lists different actions for previewing files:

- To start previewing, click **Play** .
- To stop previewing, click **Stop** .
- To pause previewing, click **Pause** .

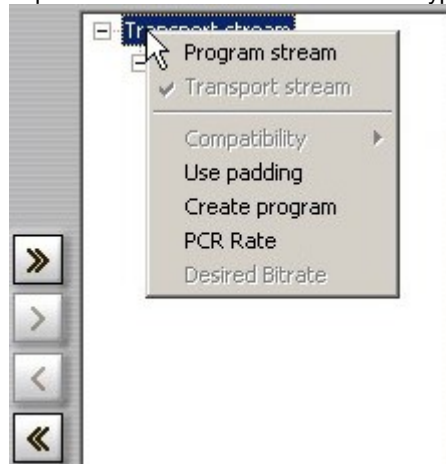
- To view a movie by frame or by Key frame when stream is indexed, click **Step backward by frame** or **Step forward by frame** .

5. To form the output stream structure use the buttons and .

6. Click **Output** to select an output path and output file name.

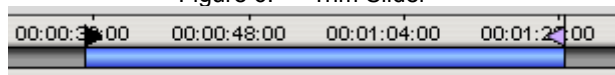
7. Right-click the upper line of the right (output) pane and select the output stream type.

Figure 5. Output Stream Shortcut Menu: Stream Type Selection



8. If you want to remultiplex only a part of the stream, you must set the limits of the output file on the **Trim** slider.

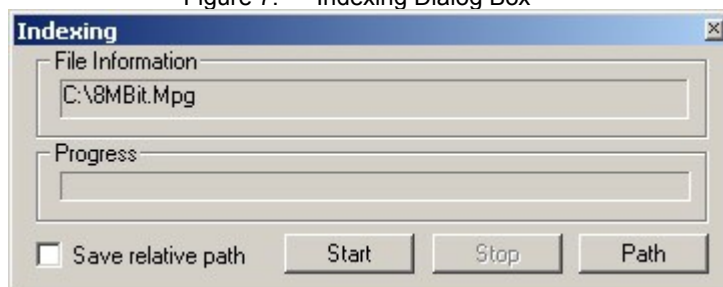
Figure 6. Trim Slider



9. To make a file with the specified parameters click **Start** .


10. To make seeking and positioning in the file more precise and fast you can index an input file. Click **Index** and the following dialog box will appear.

Figure 7. Indexing Dialog Box



11. Click **Start** and an index file will be saved in the current folder. To save an index file in

another folder clear the **Save relative path** check box.

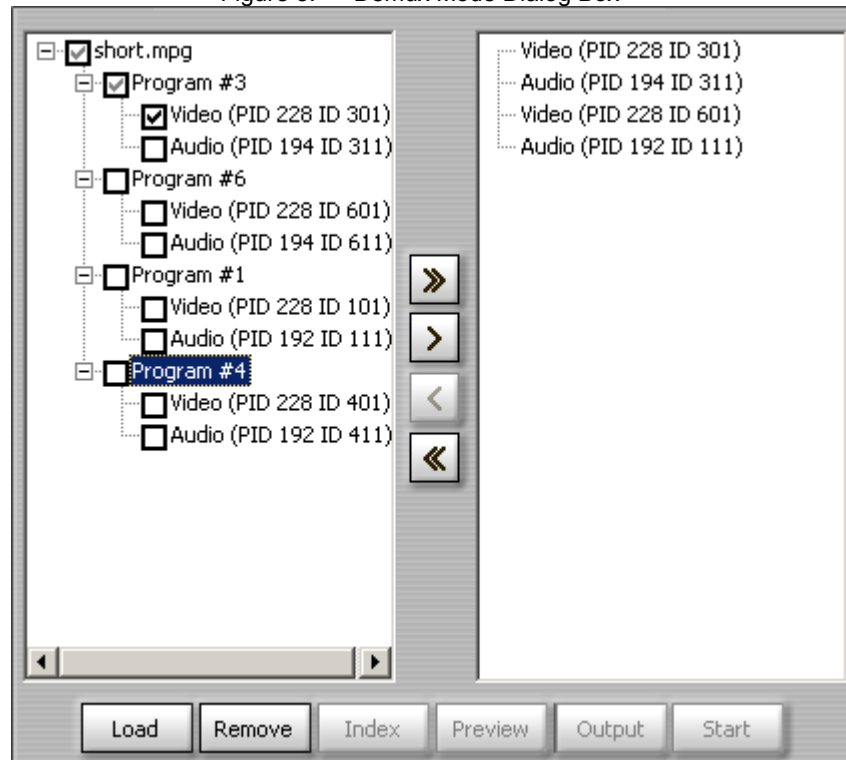
12. To close XMuxer Lite and exit the program, click .









3.3.2 Demultiplexing files

To demultiplex files accomplish the following instructions:

1. To switch on the demultiplexing mode select the **Demux** tab.

Figure 8. Demux Mode Dialog Box



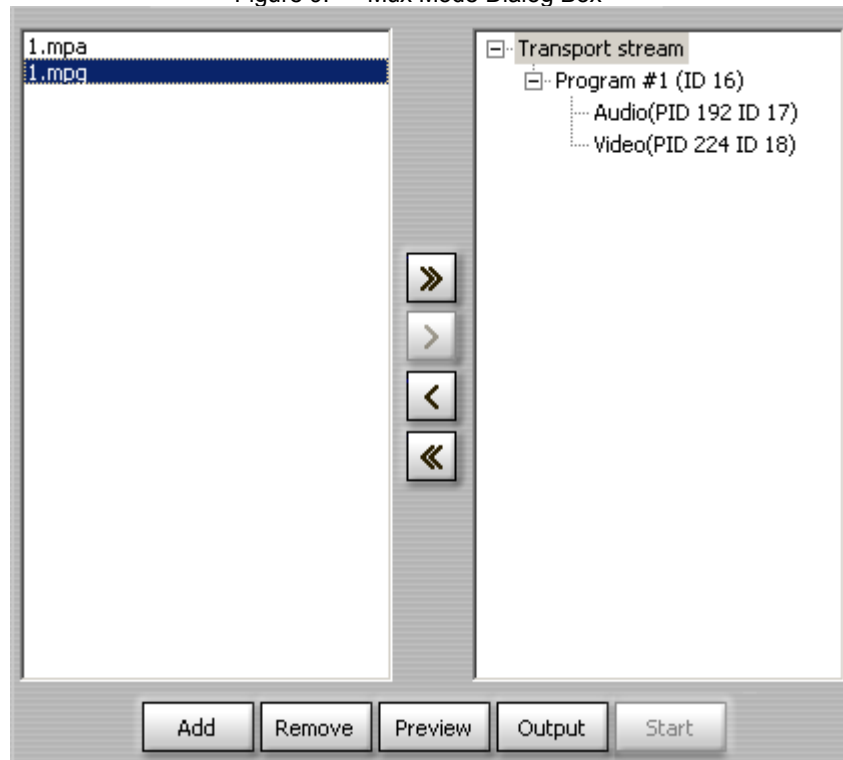
2. Click **Load** .
3. Select the folder and then the file you want to demux. To open the file click the **Output**  button or double-click the file name.
4. To select the streams for demultiplexing use the buttons   and  . Only single video stream is available for preview.
5. Select the stream you want to save and then click on **Output**  to select an output path and output file name.
6. If you want to demultiplex only a part of the stream, you must set the limits of the output file on the **Trim** slider (see the **Trim Slider** figure).
7. To make an output file with the specified parameters click **Start** .

3.3.3 Multiplexing files

To multiplex files accomplish the following:

1. To switch on the multiplexing mode select the **Mux** tab.

Figure 9. Mux Mode Dialog Box




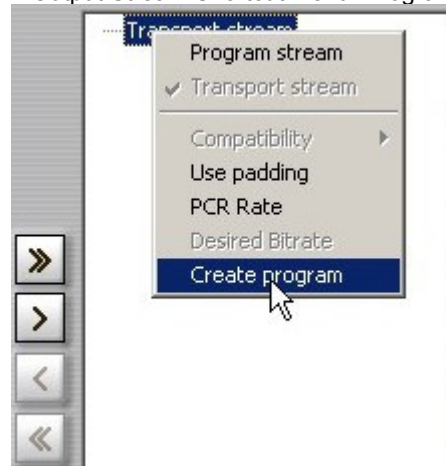


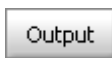


2. Click **Add** .
3. Select the folder and then the file you want to mux. Open the file by clicking the Open button or double-clicking the file name.
4. If it is necessary to multiplex several streams you should repeat items 2 и 3.
5. To create program in the output stream right-click the upper line of the right (output) pane and select the **Create program** command.

Figure 10. Output Stream Shortcut Menu: Program Creation



6. Select the created program and form the program structure using the  and  buttons.
7. Click **Output**  to select an output path and output file name.
8. Right-click the upper line of the right (output) pane and select the output stream type.
9. To remove a stream from the project select the stream and click **Remove** .
10. To make an output file with the specified parameters click **Start** .

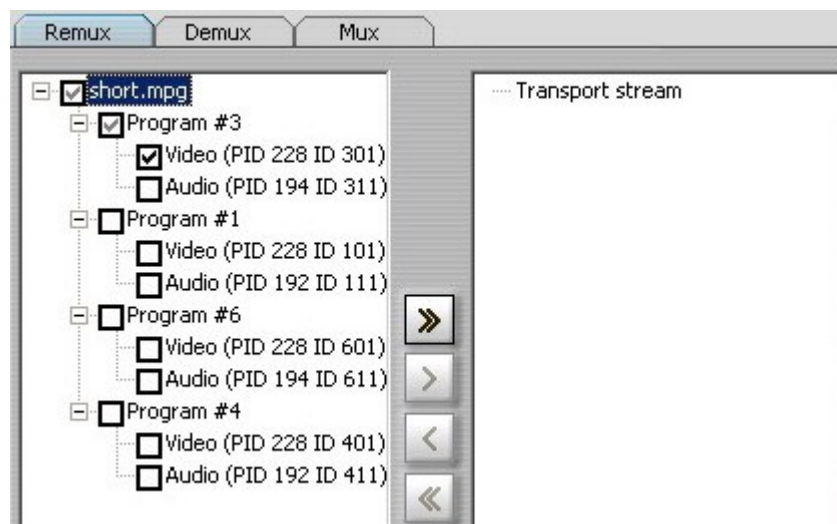
4. How to ...

This section describes methods for solving generic problems encountered when using the application.

4.1 Trim MPEG stream

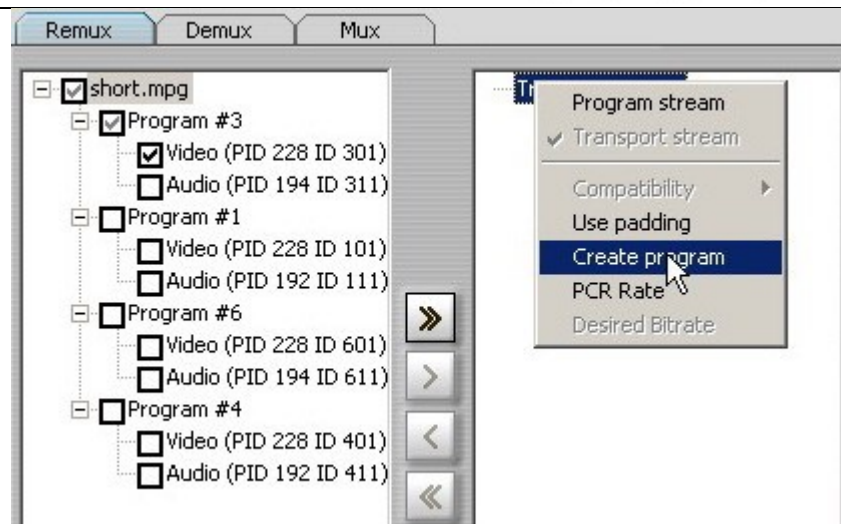
XMuxer Lite application allows trimming and saving the selected file segment only. Please use **Remux** mode to perform the task.


After the file is successfully loaded, the following input and output panes are displayed:

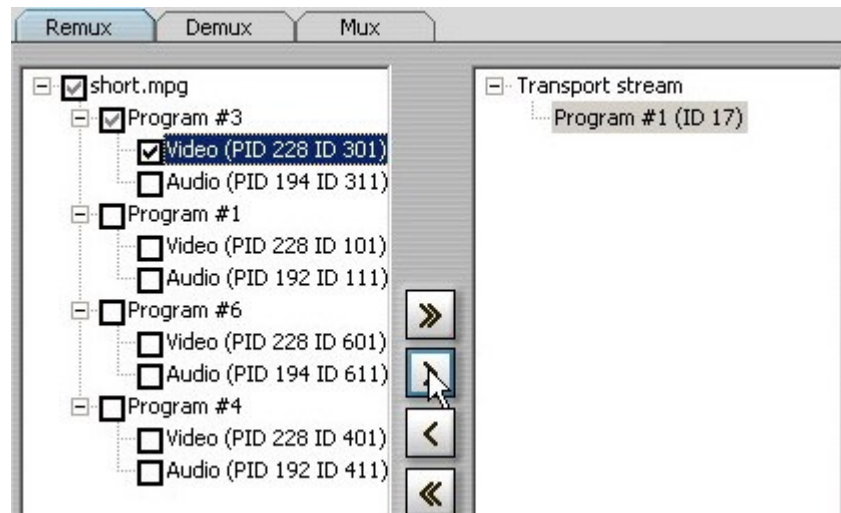


To cut out the segment of multi-program transport stream, do the following:

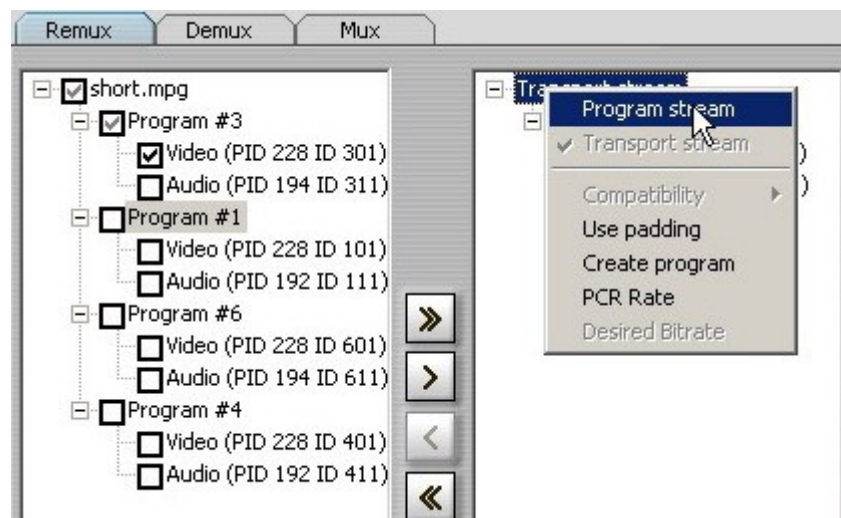
1. Right-click the item **Transport stream** and select **Create Program** command in a shortcut menu.



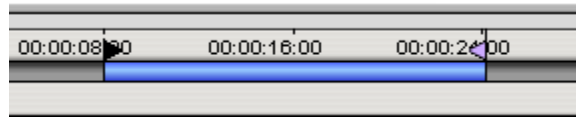
2. Use  button to add streams into the created program.

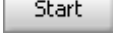


3. Right-click the item **Transport stream** and select the output stream type.



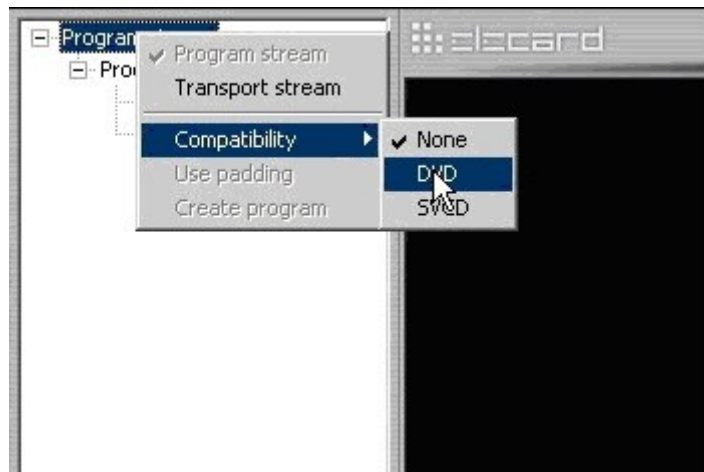
4. Mark the required stream segment using the **Trim** slider. Drag the respective flag to set the *start* and *stop* positions.



5. Choose the location and name of the output file and click **Start** .

4.2 Create file for DVD recording (from multiprogram TS)

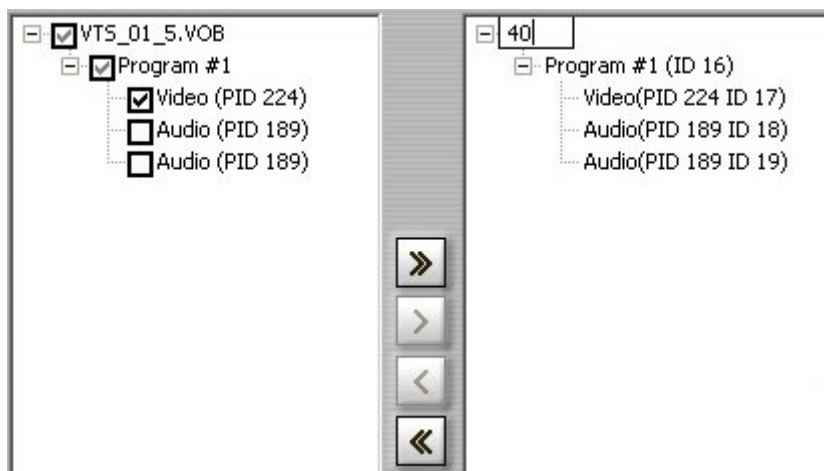
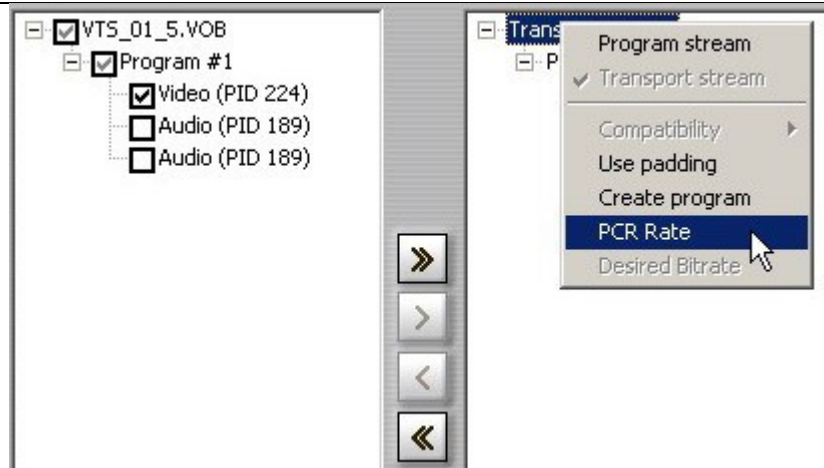
1. Perform the steps described in the previous section for one of the program.
2. Set the output stream type as **Program stream**.
3. In the **Compatibility** submenu select the **DVD** command. To do this, right-click the **Program** and the shortcut menu appears.



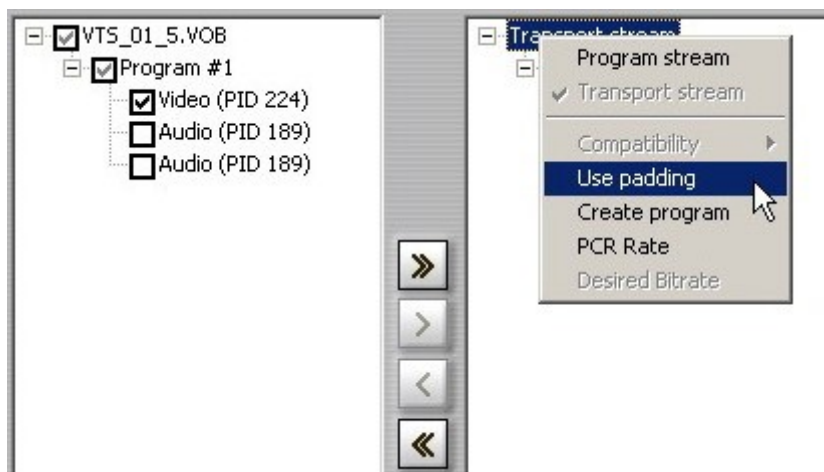
4.3 Create Transport Stream for ATSC broadcasting

To create TS for ATSC broadcasting follow the instructions below:

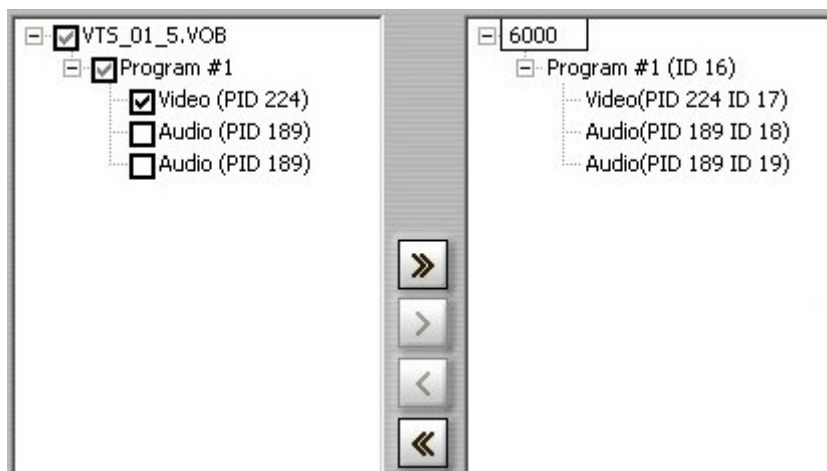
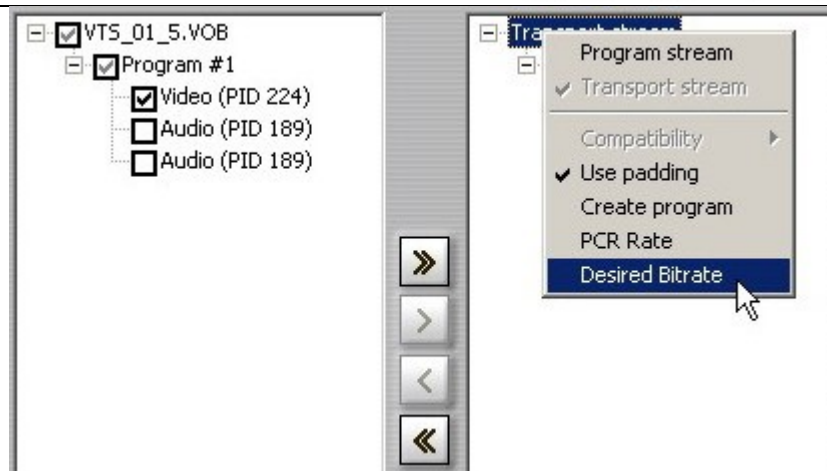
1. Perform the steps described in section 4.1.
2. Set PCR Rate value as 40 milliseconds. To do this, right-click the upper line of the right (output) pane and select the **PCR Rate** command.



3. To switch on the **Use Padding** flag, right-click the upper line of the right (output) pane and select the **Use Padding** command.

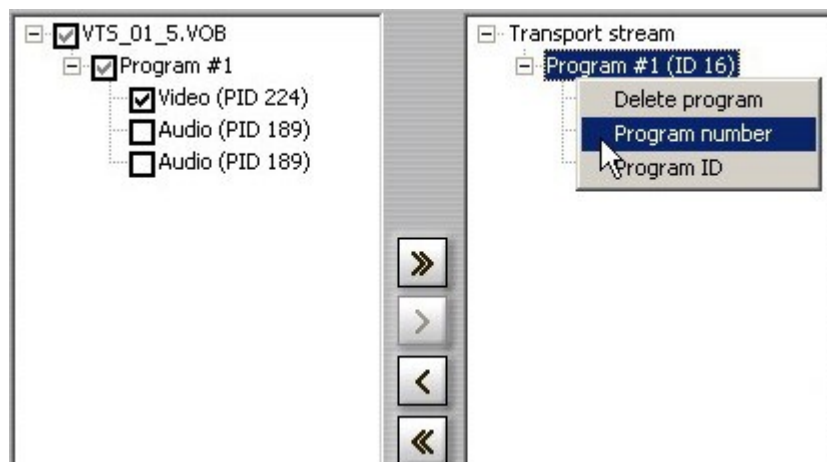


4. Set the required bitrate by selecting the **Desired Bitrate** command in the shortcut menu. The bitrate value of the output stream should be at least 5% greater than the sum of the input streams bitrates.
In case the value in the **Desired Bitrate** is null (0), the value for output bitrate is retrieved from the stream Sequence Header.



Note: As the bitrate value in the Sequence Header can be often different from the real bitrate value, the maximum possible bitrate for the given Profile&Level is automatically set.

5. Set the required program number. To do this, right-click the **Program** item and select the **Program number** command in the shortcut menu.



6. Set **Program ID**, **Stream PES ID** and **Stream ID**.

