



**SyncCert  
Audio/Video Synchronization Checker  
Tutorials**

**001-1416-00**

This document applies to firmware version 1.0  
and above.

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# Preface

This document contains four tutorials that will help you view, export, and check audio and video streams using the SyncCert application.

When digital content passes through a broadcast center, there are often several stages of de-multiplexing, encoding, decoding, and re-multiplexing. At any stage, it is possible that the time relationship between the audio and video is shifted or lost. Such errors can build up over a period of time. SyncCert can detect errors early and remedial action can be taken long before anything is noticeable on screen.

SyncCert displays a graph of audio/video sync over time, and can generate alerts based on a user-settable threshold for sync error. This application also automatically identifies the video frame number and audio frame number based on embedded codes: these codes are then used to measure the audio/video sync and report this to the alert mechanism, alert log, and in the various displays.

SyncCert provides a set of test audio and video files in common formats that can be played through the broadcast chain, captured, and automatically analyzed. These video streams are designed to be passed through the broadcast chain the same way as any other digital video stream.



# Tutorial 1: Viewing Example Streams

## Introduction

SyncCert includes two example streams that demonstrate the application stream measurement capabilities. In this tutorial you will learn how to access the example streams and how SyncCert shows delay measurements.

## Procedure

1. Start the SyncCert application by clicking the **SyncCert** icon on your desktop, or selecting the application from your Start menu.
2. Click **File > Example files > A/V Delay stream > Delay** to open the Elementary Stream Select dialog box, as shown in Figure 1. The video and audio streams contained in the example file are automatically selected.

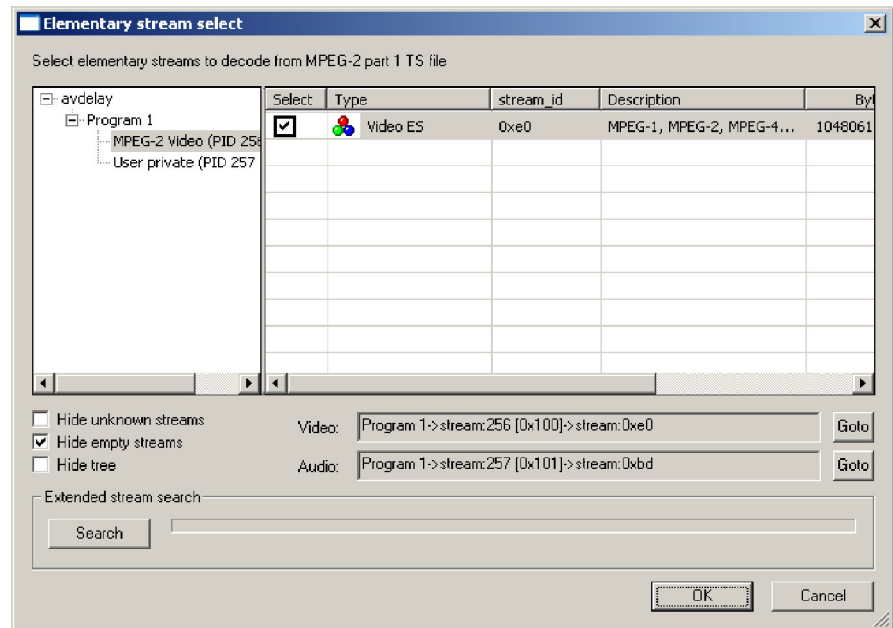
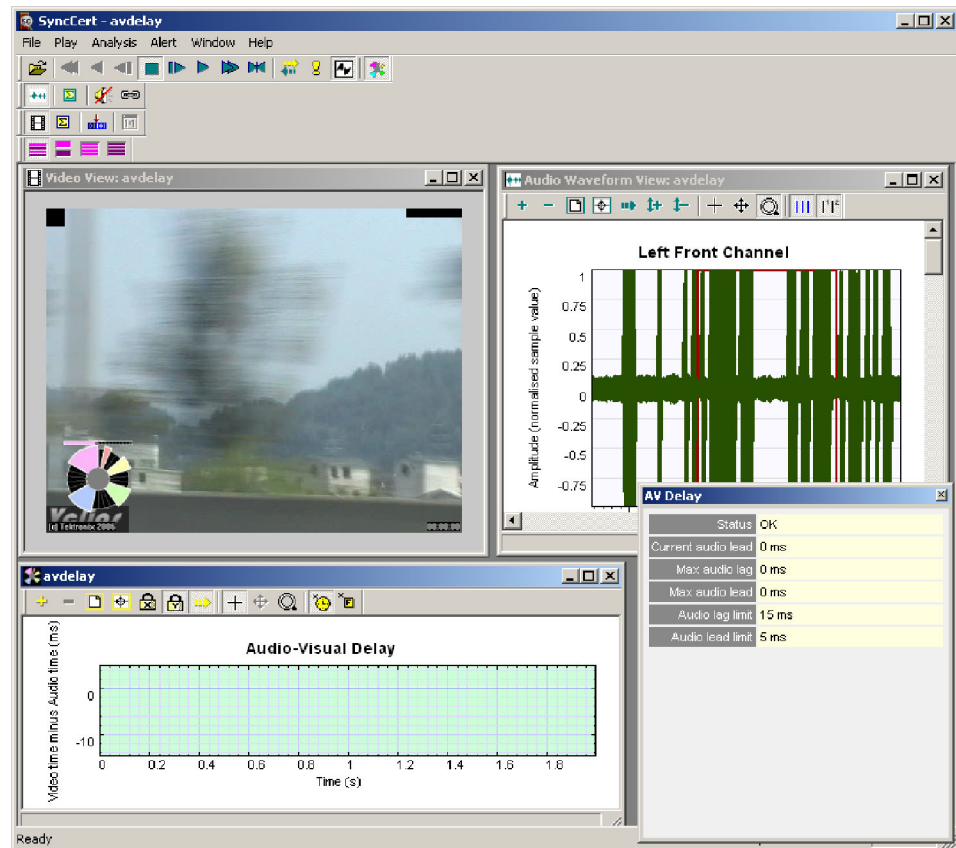


Figure 1: Elementary Stream Select dialog box

3. Click **OK**. SyncCert displays the video window, the audio-visual delay graph windows, and the audio view window as shown in Figure 2.

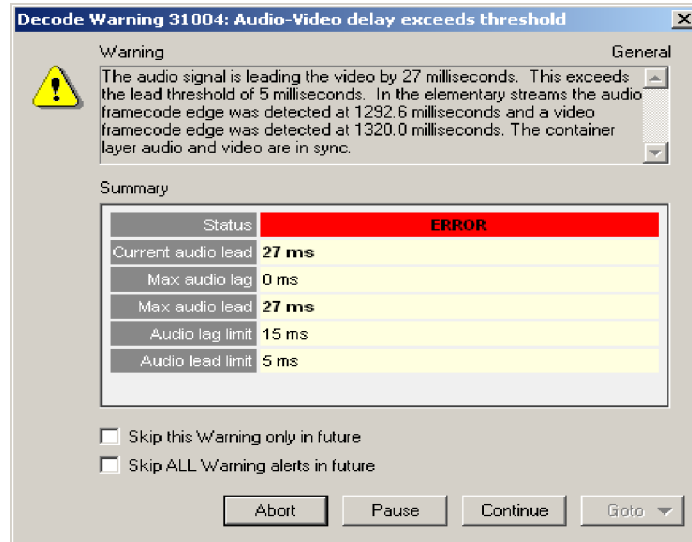


**Figure 2: SyncCert main display**

**NOTE.** To rearrange the *avdelay*, *Audio Waveform View*, *Video View*, and *AV Delay* windows, click **Window** from the menu bar and select the style you prefer. You can then manually reposition the windows. Use the *Tile vertical* option to display the left, centre, and right channel simultaneously.

4. Click the **Play** button to begin analysis. After a few seconds, an A/V delay alert warning window appears, as shown in Figure 3. This warning appears because the measured delay of 27 ms exceeds the threshold for allowable delay. The warning also specifies the point in the elementary stream at which the delay was measured.





**Figure 3: Decode Warning message dialog box**

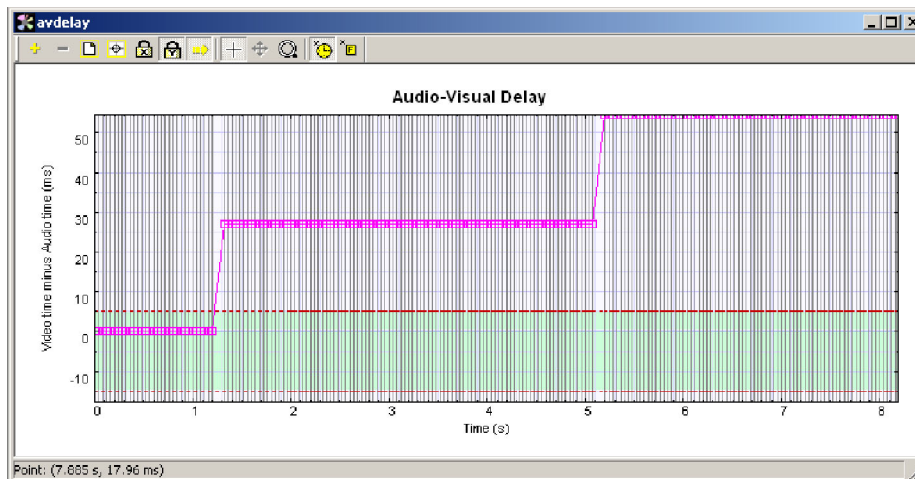
**NOTE.** In the alert window, a red error status bar tells you that there is an error occurring currently. A yellow error status bar means there are no errors now, but that errors occurred previously.

- Click **Continue** to dismiss the message and continue the analysis. After a few more seconds, another alert window will appear to indicate an increase in the delay. Subsequent alerts only appear if a delay measurement exceeds that of the last delay measurement that exceeded the threshold.

**NOTE.** For information on adjusting thresholds, see the SyncCert Audio/Video Synchronization Checker user manual.

- Click **Continue** to dismiss the message.
- Click the **Stop** button to stop the video before it reaches the end of the stream.

8. Right-click on the Audio-Visual Delay graph and select the **Fit to Range** icon to display the entire graph. This graph plots the A/V delay measurements against stream time. Figure 4 shows an example of a stream with an increasing delay.



**Figure 4: The Audio- Visual Delay graph**

## Tutorial 1 Summary

You have completed Tutorial 1, *Viewing Example Streams*. In this tutorial you learned how to:

- View available example test streams
- Retile windows for best view
- View A/V delay measurements

You are now ready to proceed to Tutorial 2.

# Tutorial 2: Exporting SyncCert Test Streams

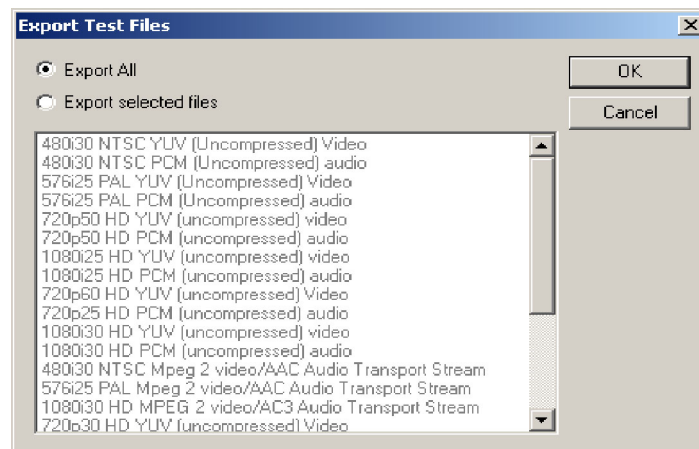
## Introduction

In this tutorial, you will learn how to select test streams and export them to your hard drive.

SyncCert uses predefined test streams to measure the A/V delay in a system. A collection of different test streams in different video formats to suit different user applications is provided with the SyncCert application. Before using SyncCert for measurement, you must first select the test streams that are suitable for your application and then export the streams to files to your hard drive.

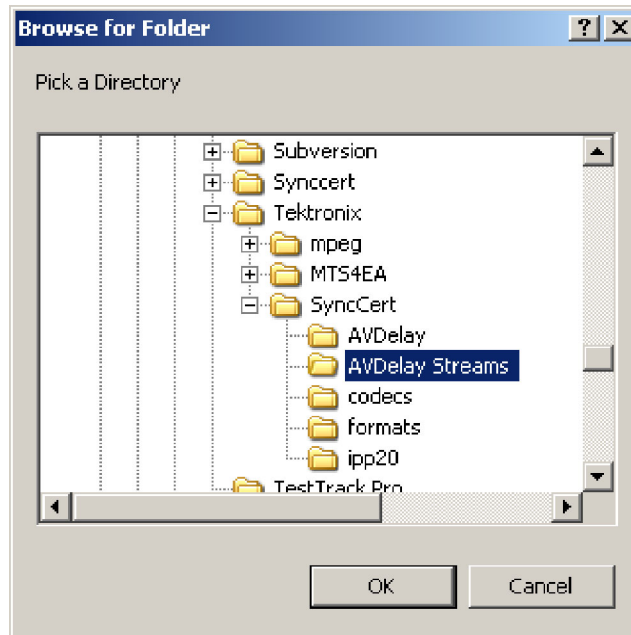
## Procedure

1. Start the SyncCert application by clicking the **SyncCert** icon on your desktop, or selecting the application from your Start menu.
2. Click **File > Export A/V Delay streams** to open the Export A/V delay dialog box, as shown in Figure 5. The list you see shows the test stream formats available in SyncCert.



**Figure 5: The Export Test Files dialog box**

3. Click **Export selected files**.
4. Click on an uncompressed video stream from the list to select it for export.
5. Click **OK**. The Browse For Folder dialog box displays as shown in Figure 6.



**Figure 6: The Browse for Folder dialog box**

6. Click the folder to which you would like the stream exported and then click **OK**. The Insert Disk dialog box displays as shown in Figure 7.



**Figure 7: The Insert Disk dialog box**

7. Insert the indicated DVD resource disk in your CD drive, or enter the path to the location of the specified file in the field. The indicated disk is one of the four DVDs supplied with the SyncCert product and contains stored test streams.
8. Click **OK**. The Export Test Files progress dialog box displays to show the progress of the file export. A confirmation message is shown when the extraction is completed successfully.

9. Repeat steps 11 through 16 for an uncompressed audio stream.

## Tutorial 2 Summary

You have completed Tutorial 2, *Exporting SyncCert Test Streams*. In this tutorial you learned how to:

- Export test stream files from application DVDs
- Save exported test stream files to a hard drive
- View A/V delay measurements

You are now ready to proceed to Tutorial 3.



# Tutorial 3: Checking the A/V Sync Delay of a Software Encoder

## Introduction

In this tutorial you will learn how to process a SyncCert uncompressed test stream and how to analyse a captured stream using SyncCert. SyncCert test stream files must be played out through the system under test and then captured as a file at the system output. The captured file is then analysed using the SyncCert software and A/V delay measurements are reported.

This tutorial requires the use of a PC-based video encoder software that can produce a compressed output stream in one of the formats supported by SyncCert. See the *MTS4EA Compressed Video ES Analyzer User Manual* for a full list of supported formats.

## Procedure

1. Complete Tutorial 2 if you have not already done so. In that tutorial, you will have exported a pair of uncompressed video and audio test streams.
2. Configure the software encoder to encode these streams and produce a compressed output file.
3. Start the SyncCert application by clicking the **SyncCert** icon on your desktop, or selecting the application from your Start menu.
4. Click **File > Open Stream** and select the newly compressed file in the File Open dialog box.
5. Click **OK**. The Elementary Stream Select dialog box is displayed as shown in Figure 8. The video and audio streams contained in the example file are automatically selected.

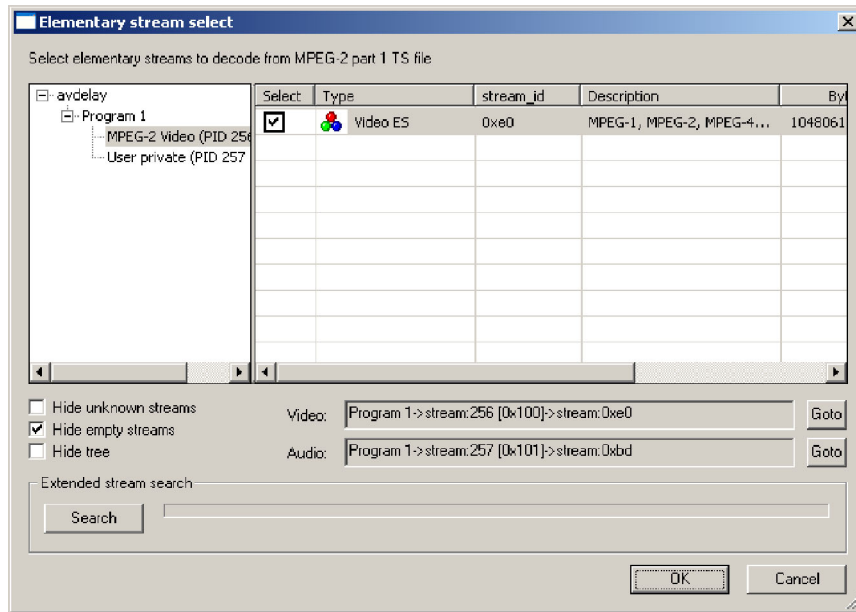


Figure 8: The Elementary Stream Select dialog box

- Click **OK**. SyncCert shows the video view window, the audio-visual delay graph windows, and the audio view window as shown in Figure 9.

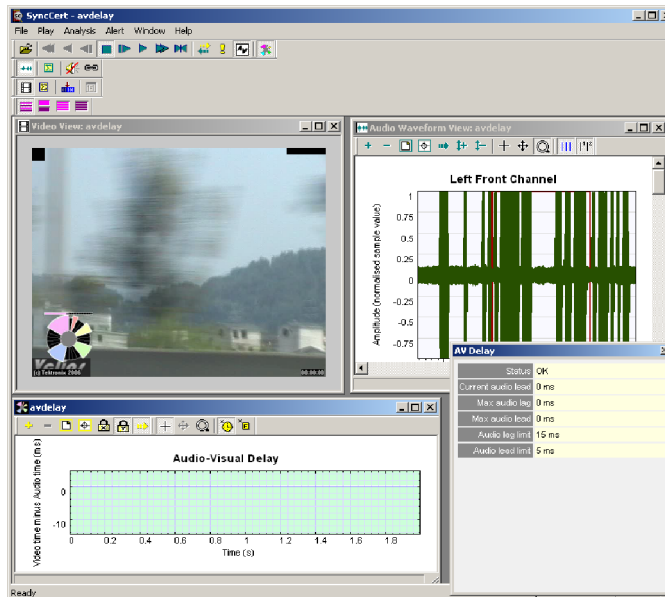
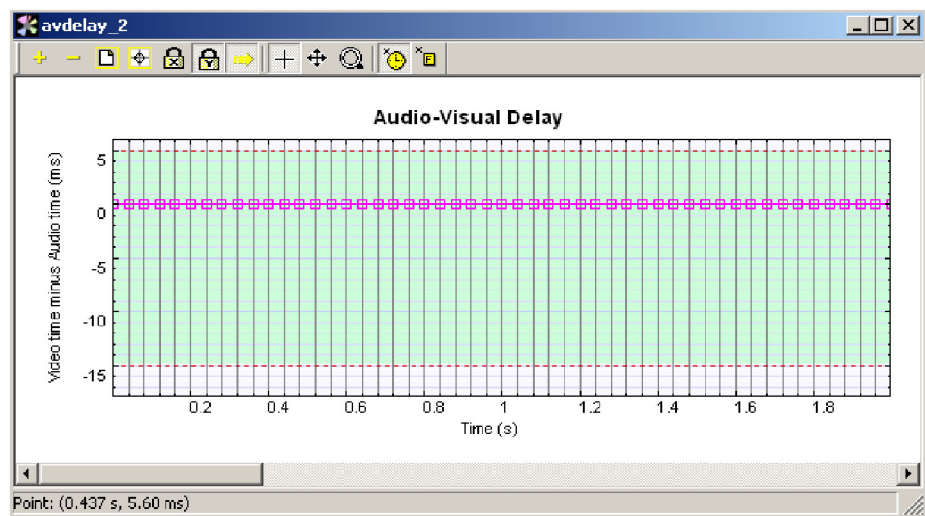


Figure 9: The SyncCert Main window



**NOTE.** To rearrange the *avdelay*, *Audio Waveform View*, *Video View*, and *AV Delay* windows, click **Window** from the menu bar and select the style you prefer. You can then manually reposition the windows. Use the *Tile vertical* option to display the left, centre, and right channel simultaneously.

7. Click the **Play** button to begin analysis. As the analysis progresses, the audio-visual delay graph plots the delay measured at each video frame in the input file. If there is no A/V delay, the graph line lies on zero, as shown in Figure 10.



**Figure 10: SyncCert plot of no A/V delay**

## Tutorial 3 Summary

You have completed Tutorial 3, *Checking the A/V Sync Delay of a Software Encoder*. In this tutorial you learned how to:

- Open a compressed file for analysis
- Check the A/V sync delay of a software encoder
- Recognize no A/V delay on the *avdelay* graph

You are now ready to proceed to Tutorial 4.



# Tutorial 4: Checking the A/V Sync Delay in MPEG-2 Transport Streams

## Introduction

This tutorial shows how to process a SyncCert MPEG-2 transport stream and how to analyse a captured stream using SyncCert. SyncCert test stream files must be played out through the system under test and then captured as a file at the system output. The captured file is then analysed using the SyncCert software, and A/V delay measurements are reported.

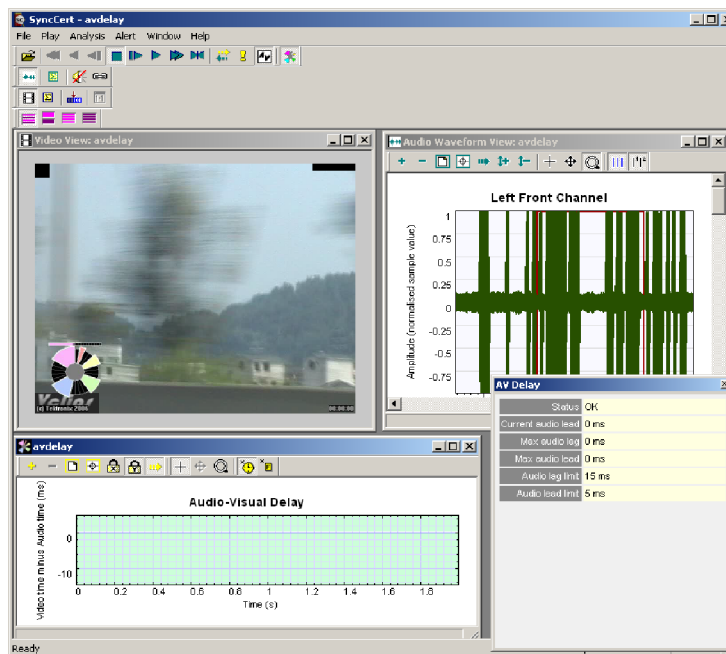
This tutorial requires the use of an MPEG-2 playback device and MPEG-2 recorder device, such as a Tektronix MTS400 or Tektronix MTX100, respectively. The MPEG-2 player should be connected to the input of the system to be tested: for example, a re-multiplexer device or other signal chain. The MPEG-2 recorder should be connected to the output of the system under test.

For the purpose of this tutorial, use a 75 ohm coax cable (for ASI) or a 25-pin parallel LVDS cable (for SPI) connection between the player and recorder devices.

## Procedure

1. Export the following test stream to a file (see Tutorial 1 for procedures): 480i30 NTSC Mpeg2 video/AAC audio transport stream.
2. Copy the test stream onto the MPEG-2 player device. Use a network connection to your PC, or use storage media such as a CD-R, to transfer the data.
3. Configure the MPEG-2 player to play the stream. Enable looped playback on the player.
4. Configure the recorder to record the incoming stream and capture it as a file on disk. It is only necessary to capture 10-30 seconds of test stream data.
5. Transfer the captured stream data file from the recorder back to the PC where SyncCert is installed.
6. Start the SyncCert application by clicking the **SyncCert** icon on your desktop, or selecting the application from your Start menu.
7. Click **File > Open Stream** to display the File Open dialog box.

8. Select the captured file name and click **OK** to open the Elementary Stream Select dialog box. The video and audio streams contained in the transport streams are automatically selected.
9. Click **OK** to display the SyncCert avdelay window, as shown in Figure 11.



**Figure 11: The SyncCert avdelay window**

10. Click the **Play** button to begin the analysis. As the analysis progresses, the audio-video delay graph plots the delay measured at each video frame in the input file. If there is no A/V delay, the graph line lies on zero, as shown in Figure 12.

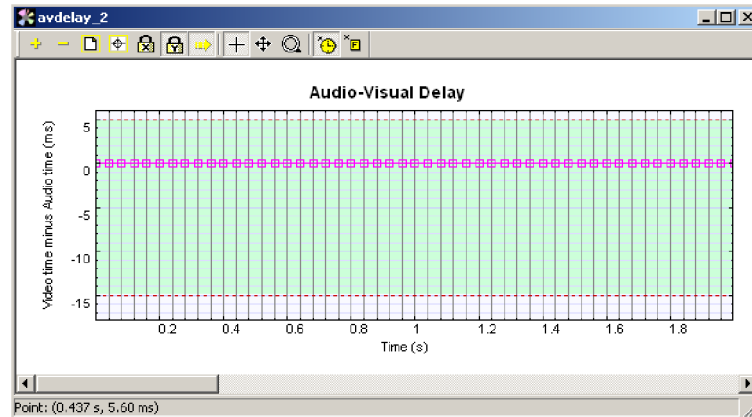


Figure 12: No A/V sync delay plot

## Tutorial 4 Summary

You have completed Tutorial 4, Viewing Example Streams. In this tutorial you learned how to:

- Process a SynCert MPEG-2 transport stream
- Copy a test stream to an MPEG-2 player device
- Analyse a captured stream

