User Manual

Tektronix

MTS300 MPEG Test System
Dolby Digital Audio Analyzer

071-0661-00

This document applies to MPEG Test System
version 5.0 firmware and above.

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Preface

This manual documents the MTS 300 Dolby Digital Audio Stream Analyzer application. If you purchased an MTS 300 Series test system and are looking for information about installation, first-time operation, or specifications, refer to the *MTS 300 MPEG Test System Hardware and Software Installation Technical Reference*, Tektronix part number 071-0667-XX.

For the latest information about MTS 300 Series Software features and bugs, refer to the *MPEG Test System Software Version 1.0 Read This First* document, Tektronix part number 071-0666-XX, that accompanied your test system, software product, or upgrade.

For information about the Windows NT Workstation operating system, refer to the Windows NT online help.

Wherever possible, this manual uses symbols and terminology consistent with Microsoft Windows and MPEG-2 standards. Refer to your Windows documentation for definitions and explanations of Windows terminology.

Manual Structure

This manual is divided into the following sections:

Getting Started. The Getting Started section contains the information that you need to get the Dolby Digital Audio Stream Analyzer up and running.

Operating Basics. The Operating Basics section contains a functional overview of the product and basic user interface operating instructions.

Reference. The Reference section contains in-depth descriptions of the analyzer capabilities, the software interface, and configuration options.

Index. Alphabetical listing of the topics covered in this manual.

Software Version

Table i lists the MTS 300 Series MPEG Test System application version number supported by this manual. To verify an application version number, select **Help** in the application menu bar; then select **About** from the Help menu.

Table i: MTS 300 Series MPEG Test System (V5.0) supported applications

Application	Version supported
Dolby Digital Analyzer	1.31 and above

Contacting Tektronix

Product Support	For questions about using Tektronix measurement products, call toll free in North America: 1-800-833-9200 6:00 a.m. – 5:00 p.m. Pacific time Or contact us by e-mail: tm_app_supp@tek.com For product support outside of North America, contact your local Tektronix distributor or sales office.
Service support	Tektronix offers a range of services, including Extended Warranty Repair and Calibration services. Contact your local Tektronix distributor or sales office for details. For a listing of worldwide service centers, visit our web site.
Toll-free Number	In North America: 1-800-833-9200 An operator can direct your call.
Postal Address	Tektronix, Inc. Department or name (if known) P.O. Box 500 Beaverton, OR 97077 USA
Web site	www.tektronix.com

Getting Started

Getting Started

The Dolby Digital Audio Stream Analyzer enables you to analyze elementary audio stream files encoded to the AC-3 standard. You can use this tool to analyze stream samples or whole records stored in files. Developers of AC-3 encoders or decoders can use this tool in their test and development phase.

Product Description

You can perform the following tasks with the Dolby Digital Audio Stream Analyzer:

- Display the structure of AC-3 streams to relate the streams to the AC-3 standard.
- Detect nonstandard streams and evaluate the cause of an audio problem.
- Analyze streams at different levels.
- Perform the following analyses: Syntactic (structural), Semantic (coherence between all components), and CRC (error checking).
- Extract audio elementary streams from transport stream files.
- Save all or part of an AC-3 audio stream as an *.AC3 file.
- Generate graphic views that provide high-level information about the characteristics and structure of the stream.
- Generate interpreted views that display field values within the stream.

Audio Stream File Types

The Dolby Digital Audio Stream Analyzer can display the following audio elementary streams formats:

- .AC3 files – Audio stream files encoded in accordance with the Advanced Television Systems Committee (ATSC) Digital Audio Compression (AC-3) Standard (December 20, 1995).
- .PRG files – MPEG-2 program stream files used in the DVD standard. You must enter the SID (stream identifier) of the AC-3 stream.
- .VOB Files – DVD video object. Streams of this type can contain up to eight AC-3 files. You must provide a stream ID (default 189) and a substream ID starting at 128.

- .TRP files – Raw MPEG-2 transport stream files used in the U.S. ATSC Digital Television broadcasting system. You must enter the PID of the AC-3 stream.

Installing Software

The Dolby Digital Audio Stream Analyzer is part of the MTS 300 Test System suite of hardware and software components used to create, generate, acquire, and analyze MPEG, DVB, and ATSC transport and program streams.

If you purchased an MTS 300 test system and need system-related information or specifications, refer to the *MTS 300 Series Hardware Installation and Specifications Technical Reference*, Tektronix part number 071-0667-XX.

On MTS 300 Test Systems

If you purchased the Dolby Digital Audio Stream Analyzer as an upgrade to an MTS 300 test system and need software installation instructions, refer to the upgrade instructions, Tektronix part number 075-0630-XX.

On Personal Computers

If you purchased the Dolby Digital Audio Stream Analyzer to install on a personal computer and need software installation instructions, refer to the software installation manual that accompanied the option, Tektronix part number 075-0630-XX.

Entering the General (License) Password

Before you can operate the Dolby Digital Audio Stream Analyzer you must enter the correct password for your software configuration. Use the procedure in your installation manual to enter the general password.

Starting the Analyzer

To start the Dolby Digital Audio Stream Analyzer, log on to your MTS 300 test system or personal computer and start Windows NT.

Locate the *Tektronix MPEG Test System* icon on the Windows NT desktop. If it is not already open, double-click the folder icon to open the program group window.

Double-click the **Dolby Digital Analyzer** icon in the program group window.

Exiting the Analyzer

To quit the Dolby Digital Audio Stream Analyzer, select **Exit** from the File menu, or click the close box in the upper-right corner of the application window.

The current analyzer configuration is preserved and used the next time you start the application.

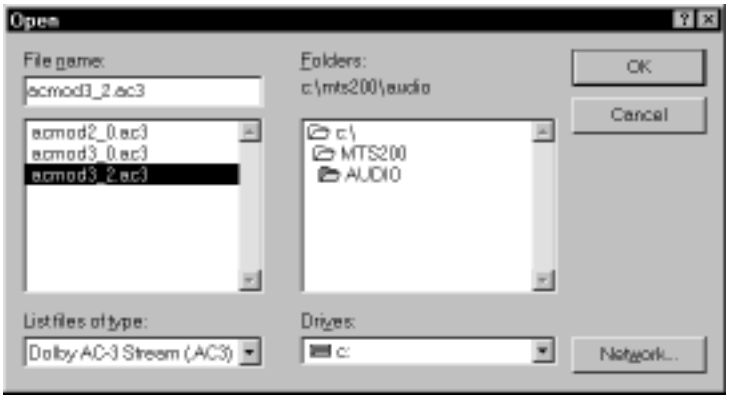
To close an active view window without exiting the analyzer application, select the close button on the active view window, or select **Close view** from the analyzer Window menu.

To close all windows without exiting the analyzer application, select **Close all** from the analyzer Window menu.

Opening an Audio Stream File

To open an audio stream file, do the following:

1. Select **Open** from the File menu. The Open dialog box displays.



   The default selection from the List files of type drop down selection box is Dolby AC-3 Stream (.AC3). To display a file that uses another suffix (see *Audio Stream File Types* on page 1–1), select the appropriate suffix from the List files of type selection box.

2. Select the AC-3 audio file you want to open.

3. Click **OK**. The Frame view and the Main Characteristics view for the audio stream open.

Operating Basics

Operating Basics

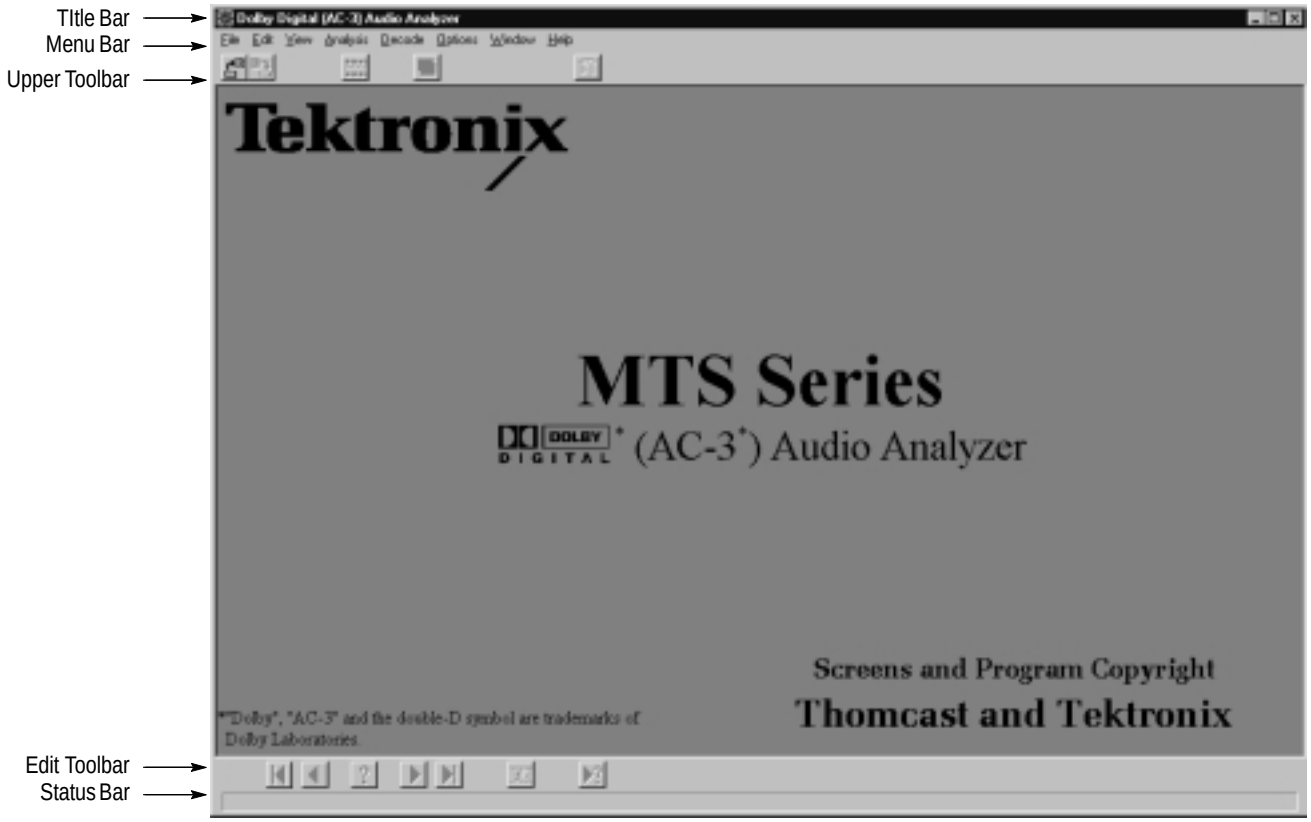
In this section you will find basic operating information, explanations of the views used to display audio streams, and menu descriptions. For basic information on the Windows operating system, such as minimizing windows or using the scroll bars, refer to your Windows documentation.

Functional Overview

The Dolby Digital Audio Stream Analyzer uses two window types to display audio streams: the Application window and the View window.

Application Window

The Application window provides the main operating environment for the analyzer. The following figure shows the basic features of the Application window.



Title Bar. In the Application window, the Title Bar displays the application name on the left and provides standard Windows window controls on the right.

Menu Bar. The Menu Bar provides access to commands that control analyzer display, analysis, and appearance. *Using Menus*, beginning on page 2–18, describes the menu selections.

Upper Toolbar. The Upper Toolbar provides shortcut buttons to some commonly used menu selections. Move the mouse over an Upper Toolbar button to display the button name.

Button	Name	Description
	**Open**	Displays the Open dialog box.
	**Save as**	Displays the Save as dialog box.
	**Frame view**	Displays the Frame view window for the active audio stream.
	**Add view**	Displays a submenu. You must specify a view to display.
	**Main characteristics view**	Displays the Main Characteristics window for the active audio stream.

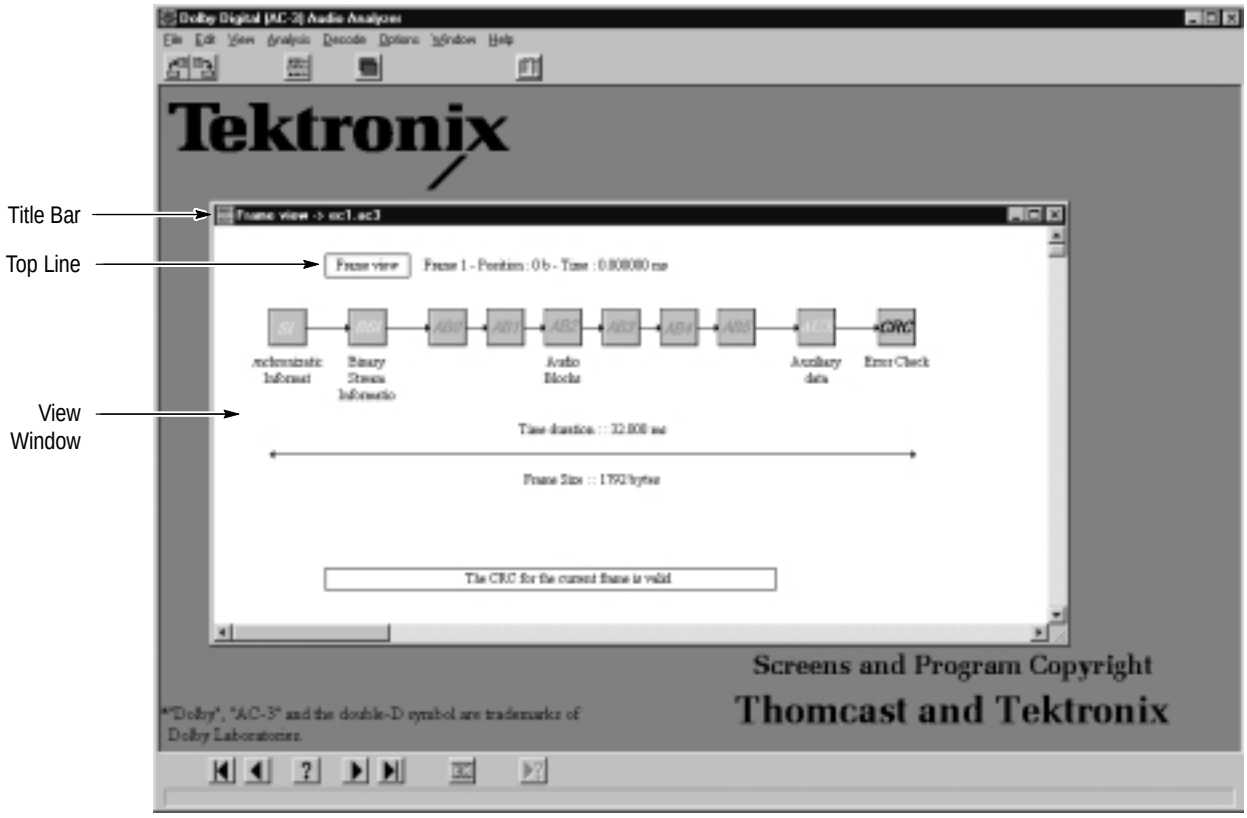
Edit Toolbar. The Edit Toolbar buttons allow you to move through the items of the current view and to view the errors in an audio stream file. The toolbar buttons are equivalent to Edit menu selections.

Button	Name	Description
	**First**	Displays the first item in the active view.
	**Previous**	Displays the previous item in the active view.
	**Go to**	Displays a dialog box to enter details about the active view you want to display.
	**Next**	Displays the next item in the active view.
	**Last**	Displays the last item in the active view.
	**Number of Items**	Counts the number of items in the element and displays the number at the top of the Interpreted view.
	**Next error**	Displays the next item in the audio stream file containing an error. This button is active when the question mark is red.

Status Bar. The Status Bar, which is located at the bottom of the analyzer window, describes a menu selection as you highlight the selection.

View Window

The View window displays the structure of an audio stream file within the Application window. The following figure shows the basic features of the View window.



Title Bar. In addition to standard window controls, the View window Title Bar provides the following information about the display:

- View type.
- Name of the displayed audio stream file (or the transport stream from which the audio stream was extracted). If you maximize the View window, this information displays in the Title Bar of the Application window.

Top Line. The top line provides the following information for AC-3 files. (This information is not available for raw AC-3 files):

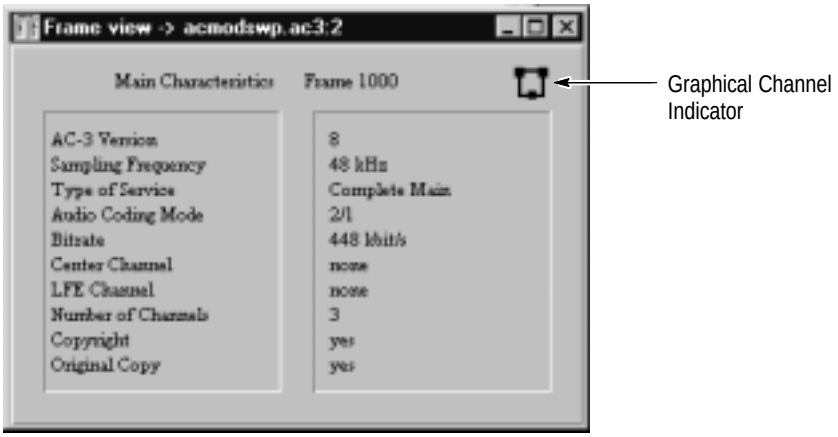
- View type.
- Frame number of the displayed element, relative to the first synchronized frame. The number of the first synchronized frame is one.
- Position of the displayed element, indicated in bytes (b) and relative to the first byte of the first synchronized frame. The position of the first synchronized frame is zero.
- Time stamp of the displayed element, indicated in seconds (s) and relative to the first byte of the first synchronized frame. The time of the first synchronized frame is zero.

Analyzer Views

This section explains the displays the analyzer uses to view data. For more complete information about these views, see the *Reference* section beginning on page 3–1.

Main Characteristics

The Main Characteristics view window displays when you open an audio stream file. You can also access this view by selecting the **Main characteristics** button from the Upper Toolbar or by selecting **Main characteristics** from the View menu. You can open a Main Characteristics view from any Frame view window. You cannot access this view from a Binary or Hexadecimal view.



The Main Characteristics view displays the main properties of the opened stream. This view has a Graphical Channel Indicator in the upper-right corner of the window.

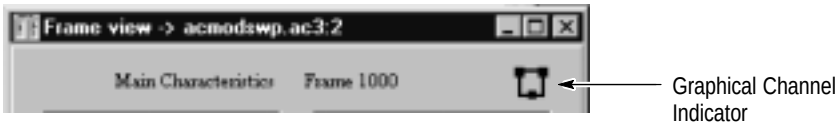
The Main Characteristics view provides quick access to the following information about the audio stream:

- AC-3 Version number. Lists the version of the displayed signal.
- Sampling Frequency. Displays the sampling frequency of the displayed signal.
- Type of Service. Displays the type of service of the displayed signal.
- Audio Coding Mode. The first displayed number represents the number of left, front, and right channels. The second number represents the number of surround channels.
- Bitrate. Displays the bitrate of the displayed signal.
- Center Channel. The analyzer displays **yes** or **none** to indicate whether a center channel is present in the analyzed stream.
- LFE Channel (Low frequency enhancement channel). The analyzer displays *yes* or *none* to indicate whether a Low Frequency Effect is present in the analyzed stream.
- Number of Channels. The total number of channels that are present in the analyzed stream, including front channels, surround channels, and center channel.
- Copyright. The analyzer displays *yes* or *none*.
- Original Copy. The analyzer displays *yes* or *none*.

Graphical Channel Indicator. The area in the upper-right corner of the Main Characteristics window contains the Graphical Channel Indicator. In this area, black blocks represent the audio channel configuration as explained in the following table.

Block location	Channels present in the stream
Upper left corner	Left channel
Upper right corner	Right channel
Middle of top line	Center channel
Middle of bottom line	Surround channel
Lower left corner	Left surround channel
Lower right corner	Right surround channel
Center of the square	LFE channel

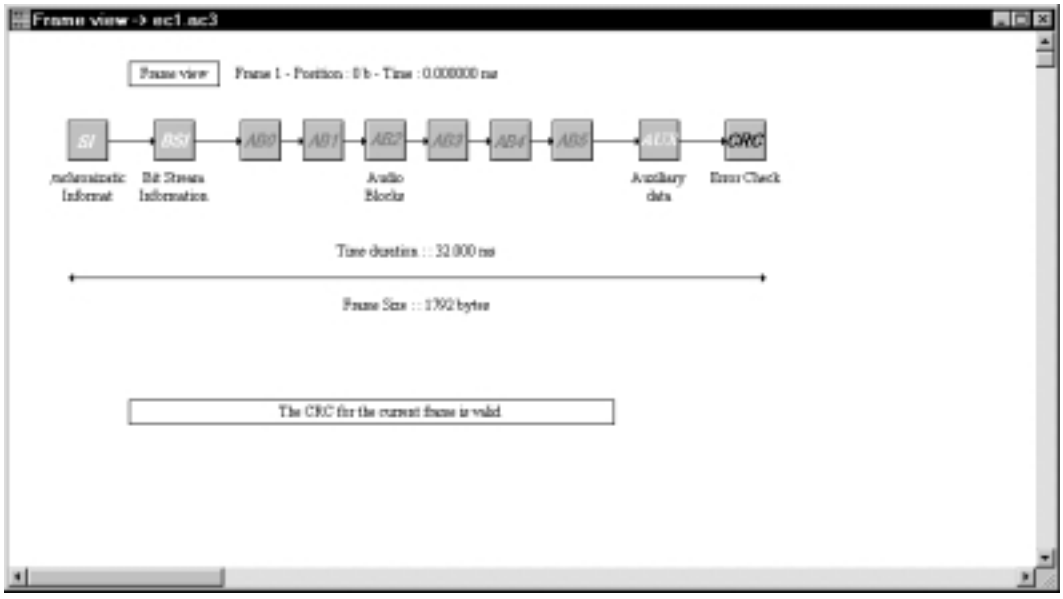
In the example below, the Graphical Channel Indicator displays a frame with three audio channels: a left channel, a right channel, and a surround channel.



Frame View

When you open an audio stream file, the Frame view automatically opens. You can add additional views of the same frame by selecting **Add view** from the Window menu or by selecting **Add view** in the Upper Toolbar and selecting **Frame view** from the View Type submenu.

Adding views does not allow you to compare one frame with another. In order to do so, you must display separate View windows directly from the parent view window. (From the View menu select **Frame view**). You can also display frames in Binary or Hexadecimal as explained on page 2–9.



The Frame view is a graphic representation of the elements associated with the audio stream, one frame at a time. Each element is represented by an icon. Double-click any of the icons to open a more detailed view (interpreted view) with additional information. Interpreted views provide a graphical way to look at AC-3 audio stream elements. You can navigate through each frame in the various element files with the Edit Toolbar.

SI, BSI, AUX, and CRC Views. To open an interpreted view of the elements listed below, double-click the icon in the Frame view. See the following pages in the *Reference* section for additional information:

- SI (Synchronization Information) See page 3–5
- BSI (Bitstream Information) See page 3–5
- AUX (Auxiliary Data) See page 3–15
- CRC (Cyclic Redundancy Check) See page 3–16

Audio Block Views. When you double-click an Audio Block icon, the analyzer displays several elements horizontally, representing the block's primary syntactic structure. These component elements are also positioned vertically, according to information type:

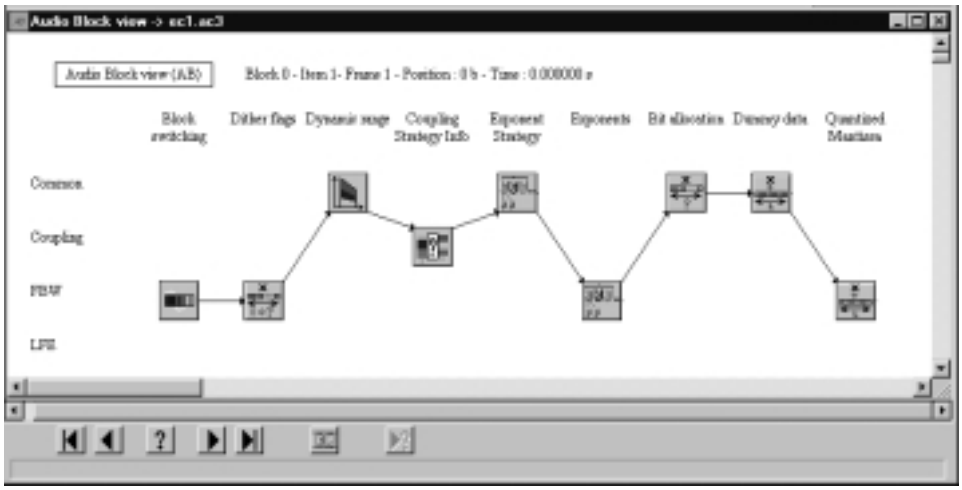
- Common information
- Coupling channel
- Full Bandwidth channels (FBW)
- Low Frequency Enhancement channel (LFE)

With the Frame view active, you can select any audio block view (AB0-AB5) either by double-clicking the desired icon in the Frame view, or by selecting it through the View menu. You can also add an Audio Block view using the Add view command from the Window menu or Upper Toolbar.

In every view dealing with the audio blocks of a frame, the displacement unit is the block. All views display the current block number (from 0 to 5).

Each block icon represents real data read in the stream and their block representation represents the order of appearance in the frame. Read the structures from left to right and from top to bottom.

The current frame determines the presence of icons representing the Dynamic Range Control, the Rematrixing Flags, and the Delta Bit Allocation. The following illustration shows the maximum expansion of the view.



When the current view is an optional syntactic view such as Delta Bit Allocation, the Next button may not find any other information of this type in the following blocks, so the Next command may fail. In this case, terminate the search by pressing the **ESC** key.

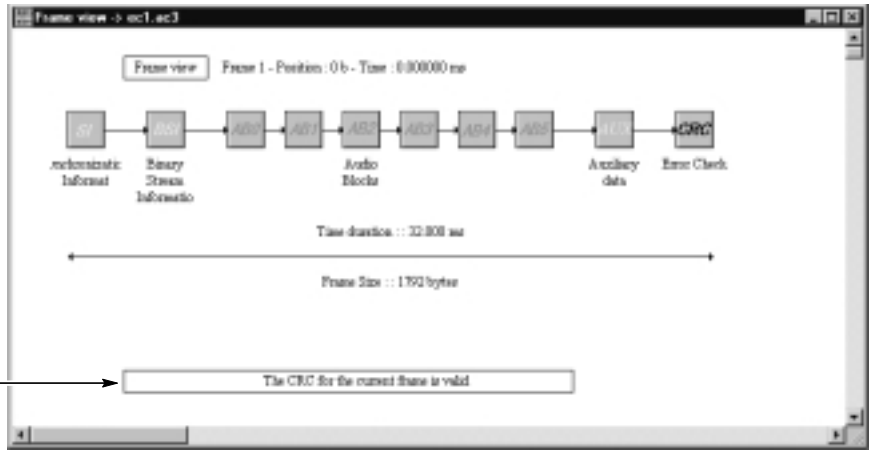
Audio Block Interpreted Views. When you double-click an Audio Block icon, the analyzer displays an interpreted view of the MPEG elements listed below. The display formatting changes depending on the type of data.

See the following pages in the *Reference* section for additional information:

- Block Switching — See page 3–7
- Dither Flags — See page 3–7
- Dynamic Range Control — See page 3–7
- Coupling Strategy Information — See page 3–8
- Coupling Data — See page 3–8
- Rematrixing — See page 3–9
- Exponent Strategy — See page 3–10
- Exponents — See page 3–10
- Bit Allocation — See page 3–12
- Delta Bit Allocation — See page 3–13
- Dummy Data — See page 3–14
- Quantized Mantissas — See page 3–15

CRC Status Message. Each time you open a frame, the analyzer performs a CRC analysis and displays the result at the bottom of the Frame view. This status message indicates one of the following conditions:

- The entire current frame is valid.
- The first 5/8 frame is valid; the remaining data may be corrupt.
- The last 3/8 frame is valid.
- The entire frame is invalid.



Binary and Hexadecimal View

The Binary and Hexadecimal views display the audio bitstream for the AC-3 syntax indicated in the Top Line of the Frame view window.

To display a Binary or Hexadecimal view, do the following:

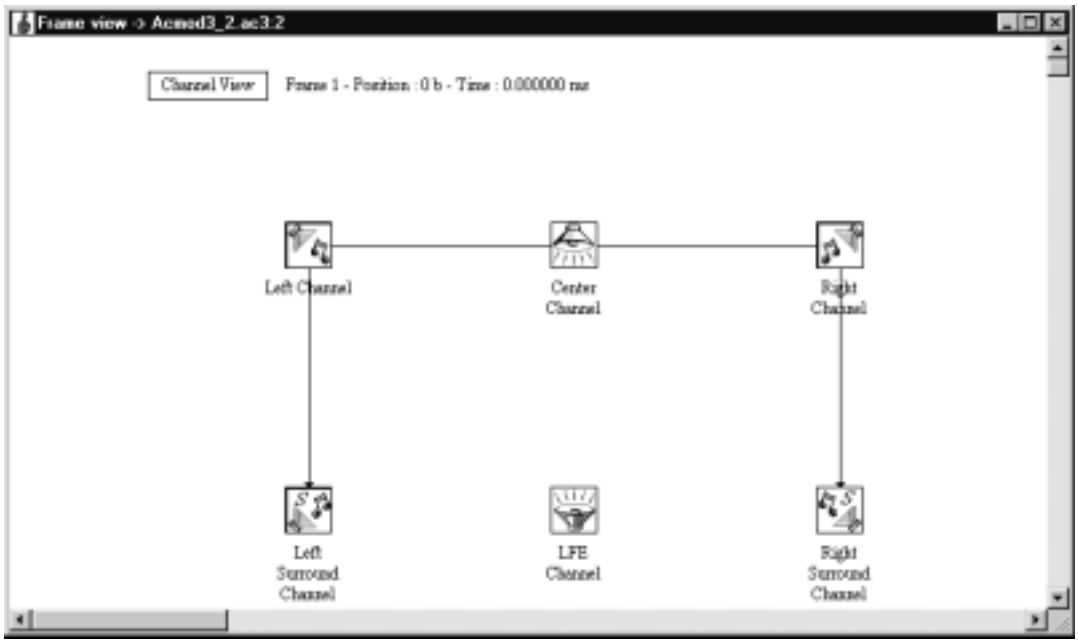
1. Click the **Add view** button in the Upper Toolbar or select **Add view** from the Window menu.
2. Select the type of view you want to add: Binary or Hexadecimal. If a view is dimmed in the menu, that view is unavailable.

Channel View

The Channel view displays the number and type of channels encoded in the audio stream file.

Display the Channel view using the following procedure:

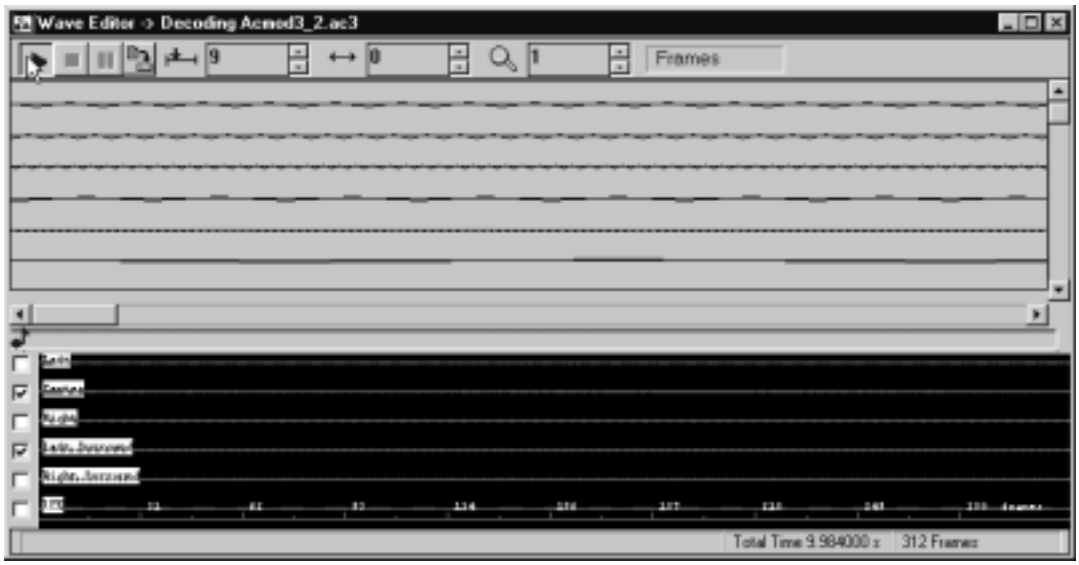
1. Navigate to the First Level view for the audio file.
2. Select **Add View** from the Window menu (or click the Add View icon from the upper toolbar).
3. Select **Channel View** from the submenu, and the Channel view window is displayed.



From the Channel view, you can decode all or part of the audio file by right-clicking one of the icons and selecting the appropriate option from the submenu. After that portion of the audio file has been decoded, the Wave Editor view is displayed. See *Decoding Audio Stream Files* on page 2–13.

Wave Editor View

Immediately after you decode an audio stream file, the Wave Editor view window is displayed. From this window you can view the decoded audio stream waveform, play the decoded audio file, and save the audio file (or a portion of it) as a .wav file. To listen to the decoded audio stream, you must have a sound card installed on your computer.



To display the Wave Editor window, perform one of the decoding procedures described in *Decoding Audio Stream Files* on page 2–13.

NOTE. *The Wave Editor view window is displayed only after the analyzer has finished decoding an audio stream file. The editing capabilities of the Wave Editor are limited to selecting a portion of the decoded audio stream to save or playback.*

The following list describes the elements of the Wave Editor view window. Table 2–1 on page 2–12 describes the Wave Editor toolbar elements.

- The title bar displays the decoded file name and location.
- The Wave Editor toolbar displays the controls you use to play, save, and select portions of the waveform.
- The middle and bottom sections displays the analog waveform of one or more decoded channels.

  The bottom section displays the waveforms compressed to fit the width of the view window. If **Display in frames** is checked in the Options menu, the horizontal unit of measurement is audio stream frames. If **Display in milliseconds** is checked, the unit of measurement is milliseconds.

- The checkboxes to the left of the bottom section let you specify which two channels to play when you listen to the .wav file.
- The 1/8th note indicates the position in the sound file as the decoded audio stream is played.
- The total time (in seconds) and length (in frames) of the decoded audio file is indicated in the lower right of the view window.

Table 2–1: Wave Editor toolbar elements

Element	Name	Description
	**Play**	Starts playing the decoded audio file. Unless you have selected a portion of the waveform, the complete waveform is played when you select this command button. If a portion of the waveform is selected, only the selected portion of the sound file is played.
	**Stop**	Stops playing the decoded audio file.
	**Pause/Resume**	Pauses and resumes playing the decoded audio file.
	**Save As**	Saves the decoded audio file. Unless you have selected a portion of the waveform, the complete waveform is saved when you select this command button. If a portion of the waveform is selected, only the selected portion of the sound file is saved.
	**Position**	Sets the position of the cursor in the bottom part of the Wave Editor view window. Change the position of the cursor by selecting the up and down buttons, or by clicking in the bottom waveform display.
	**Selection**	Selects a portion of the audio file. The selected portion of the audio file starts at the cursor position. Change the selected portion of the waveform by selecting the up and down buttons, or by clicking and dragging in the bottom waveform display. The selected portion of the waveform determines which part of the audio file will be played and saved.

Table 2–1: Wave Editor toolbar elements (cont.)

Element	Name	Description
	**Zoom**	Sets a horizontal zoom factor for the upper waveform display. Change the zoom factor by selecting the up and down buttons, or by moving the scroll bar. Initially, the waveform is displayed at the highest zoom factor.
	**Display**	Sets the unit of measurement used in the Wave Editor view window. Set the unit used for the Wave Editor by selecting either **Display in frames** or **Display in milliseconds** from the Options menu. The current unit of increment has a check mark next to it in the Options menu.

You can add another Wave Editor view window using the following procedure:

1. Ensure that the Wave Editor view window is the active view window.
2. Click the **Add View** command button from the Upper toolbar.

   Alternatively, select **Add view** from the Window menu.

Decoding Audio Stream Files

You can decode audio streams and view the audio waveform (or waveforms) using the Wave Editor window (see Wave Editor View, beginning on page 2–11).

As part of the decoding process, a .wav file is created for each channel encoded in the audio stream that you choose to decode. The files for specific channels are identified by appending the channel name and .wav to the prefix of the audio stream file name. For instance, if the audio stream file you decode is named `ACmod3_2.ac3` (a five channel audio elementary stream file) and you decode all channels in the stream, the following .wav files are written to the same directory as the .ac3 file:

- `ACmod3_2_Center.wav` (center channel)
- `ACmod3_2_Left.wav` (left channel)
- `ACmod3_2_LFE.wav` (LFE channel)
- `ACmod3_2_Right.wav` (right channel)
- `ACmod3_2_SurLeft.wav` (left surround channel)
- `ACmod3_2_SurRight.wav` (right surround channel)

The following list describes the options available for decoding and saving audio stream data:

- All channels for the complete audio stream
- All channels for a specific part of the audio stream
- Selected channels for the complete audio stream
- Selected channels for a specific part of the audio stream

There is more than one way to carry out each of the following procedures. Each procedure shows only one way performing the indicated task.

Decoding a Complete Audio Stream. Decode all of the channels for a complete audio stream using the following procedure:

1. Navigate to the First Level or Channel view window.
2. Click **Separate Decoding** form the Decode menu, and then select **Decode All Channels** from the submenu.

   The dialog box shown below is displayed.

3. In the Decoding Range dialog box, click **Complete**.

After the audio stream is decoded, the Wave Editor window is displayed (see page 2–11).

Decoding Part of an Audio Stream. Decode all of the channels for part of a audio stream using the following procedure:

1. Navigate to the First Level or Channel view window.
2. Click **Separate Decoding** from the Decode menu, and then select **Decode All Channels** from the submenu.

   The dialog box shown above is displayed.

3. Select one of the following options from the Decoding Range dialog box:

   - **Partial Frames**. If you select this option, enter the stop and start frames in the text boxes to the right.
   - **Partial ms**. If you select this option, enter the stop and start time in milliseconds in the text boxes to the right.

After the file has been decoded, the Wave Editor window is displayed (see page 2–11).

Decoding Specific Channels of Audio Streams. To decode a specific channel for part of an audio stream, use the following procedure:

1. Navigate to the Channel view window.

   a. Navigate to the First Level view for the audio stream you want to decode.

   b. Select **Add View** from the Window menu, and then select **Channel View** from the submenu.

2. Right-click the channel icon for the channel you want to decode and select **Decode** from the submenu .

   The dialog box shown on page 2–14 is displayed.

3. Select one of the following options from the Decoding Range dialog box:

   - **Partial Frames.** If you select this option, enter the stop and start frames in the text boxes to the right.
   - **Partial ms.** If you select this option, enter the stop and start time in milliseconds in the text boxes to the right.

After the file has been decoded, the Wave Editor window is displayed (see page 2–11).

Downmixing Audio Stream Files. Use the downmixing capability of the Dolby Digital Audio Stream analyzer to downmix or upmix an AC–3 audio stream file.

1. From a Channel View, select **Downmixing** from the Decode menu. The following dialog box is displayed.

2. Select the output mode. The first displayed number in the Output mode options represents the number of left, center, and right channels. The second number represents the number of surround channels. The way in which the analyzer downmixes (or upmixes) audio stream files corresponds to the Dolby Digital documentation.
3. If appropriate, select whether or not to downmix the LFE channel.
4. Select the part of the stream you want to decode:
   - **Part of the stream by frames**. If you select this option, enter the start and end frames in the text boxes to the right.
   - **Part of the stream by milliseconds**. If you select this option, enter the start and end times (in milliseconds) in the text boxes to the right.
   - **The complete stream**.
5. Click **OK**.

When the downmixing is completed, the Wave Editor is displayed (see page 2–11).

Graphical Views

The analyzer can plot three types of graphs: Dialog Normalization, Heavy Compression, and Dynamic Range. The analyzer plots the item number on the horizontal axis and the value on the vertical axis. For additional information about these graphs, see *Graphical Views* beginning on page 3–16.

Adding Views

To add multiple view windows to the Application window, select **Add View** using the Upper Toolbar or the Window menu, and then select the view type you want to display. When you display a new view with this method, the Edit Toolbar functions navigate through all added views, active or inactive.

When the active view is an interpreted view, you can add a Binary or Hexadecimal view of the information displayed in the interpreted view.

To add a view using the Add View command, do the following:

1. For this example, open the Synchronization Information (SI) view. Make sure it is active (highlighted).
2. Click the **Add view** button in the Upper Toolbar, or select **Add view** from the Window menu.
3. Select the view you want to add from the resulting menu. For this example, select the **Hexadecimal**.
4. Use the Edit Toolbar to navigate to Frame 5. Both views change to show the synchronization information for Frame 5.

You may find it useful to compare interpreted views of the various audio block components. To compare blocks, items, and frames, do the following:

1. From the Audio Block view, double-click the icon for the audio block component that you want to analyze. This displays the interpreted view for that component.
2. Select the Audio Block View again (make it active), and double-click the same icon as in step 1.
3. When the second audio block interpreted view window appears, dismiss the Audio Block View window.
4. Use the Edit Toolbar buttons to navigate to the desired blocks, items, and frames. Only the active window changes, allowing you to compare the fields and values of the various items between windows.

The following table shows the available views:

From this view window	You can display
Frame view	■ Additional Frame view ■ Binary or Hexadecimal view ■ Additional Main Characteristics view ■ Channel view
Interpreted view	■ Additional interpreted view ■ Binary or Hexadecimal view
Binary or Hexadecimal view	■ Interpreted view of the syntax ■ Binary or Hexadecimal view
Main Characteristics	■ Additional Frame view ■ Binary or Hexadecimal view ■ Additional Main Characteristics view ■ Channel view
Channel view	■ Frame view ■ Binary or Hexadecimal view ■ Main Characteristics view ■ Additional Channel view
Wave Editor view	■ Additional Wave Editor view

Using Menus

The analyzer menus allow you to execute commands and access the main syntactic views. You can use the keyboard or mouse to access the analyzer menus. You can also use the Upper Toolbar buttons as shortcuts to some menu selections.

Using the Keyboard. To open a menu, press and hold the **ALT** key while you press the underlined letter in the menu name. For example, to open the File menu, press and hold the **ALT** key while you press **F**. To select a command after you open a menu, press the underlined letter in the command name, or use the arrow keys to highlight the command and then press **ENTER**. To close a menu, press the **ESC** key.

Using the Mouse. To open a menu, click the menu name in the Menu Bar. To select a command from an open menu, click the command name. To close a menu, click outside the menu.

Using the Upper Toolbar. Click an icon in the Upper Toolbar to open the associated submenu or to execute the associated command.

Table 2–2 describes each of the menu selections.

Table 2–2: Menu selections

Menu	Selection	Description
File	**Open**	Displays the Open dialog box to identify the existing audio stream file you want to view. Identical to the Open button on the Upper Toolbar.
	Close	Closes the active audio stream.
	Save as	Displays the Audio Stream Saving dialog box to specify how much of the stream you want to save. After you select OK, a standard Save As dialog box displays. Same as the Save as button on the Upper Toolbar.
	Print	Displays a standard Print dialog box to print the active view window.
	Printer setup	Displays the Page Setup dialog box from which you specify the paper size, orientation, and page margins. The dialog box also provides access to printer options.
	Exit	Ends the session and closes the Dolby Digital Audio Stream Analyzer application.
Edit	**Next Item**	Displays the next item in the audio stream.
	Previous Item	Displays the previous item in the audio stream.
	First Item	Displays the first item in the audio stream.
	Last Item	Displays the last item in the audio stream.
	Go to	Displays the specified item in the audio stream.
	Number of Items	Calculates the number of items in the active view and displays the number in the upper portion of the active view window.
	Next error	Displays the next item in the audio stream that contains an error.
View	**Main Characteristics**	Opens a Main Characteristics Frame view window of the audio stream indicated in the Title Bar.
	Frame view	Opens a Frame view of the audio stream indicated in the Title Bar.
	SI View	Opens a Synchronization Information view. Same as double-clicking on the SI icon in the Frame view.
	BSI View	Opens the Bit Stream Information view. Same as double-clicking on the BSI icon in the Frame view.

Table 2–2: Menu selections (cont.)

Menu	Selection	Description
	Audio Block View	Displays a submenu of Audio Blocks 0 through 5. Selecting any block opens the corresponding Audio Block view. Same as double-clicking any of the Audio Block icons (AB0-AB5) in the Frame view.
	Auxiliary Data View	Opens the Auxiliary Data View. Same as double-clicking on the AUX icon in the Frame view.
	CRC View	Opens the CRC (error checking) view. Same as double-clicking on the CRC icon in the Frame view.
Analysis	**Syntactic**	Performs a Syntactic analysis on the audio stream indicated in the Title Bar of the secondary window.
	Semantic	Performs a Semantic analysis on the audio stream indicated in the Title Bar of the primary window.
	Automatic	Performs the analyses you selected in the Options menu for Automatic Analysis.
Decoding	**Downmix**	Displays the Downmixing dialog box, from which you select the mode in which you want to downmix (or upmix) an audio stream file.
	Separate Decoding	Displays a submenu allowing you to specify which channel you want to decode (the list of available channels depends on the number and type of channels encoded in the active file).
	Stream Summary	Generates a textual stream summary.
	Graph	Displays a submenu allowing you to select from three graphical displays: the Dialog Normalization graph, the Heavy Compression graph, and the Dynamic Range graph.
Options	**Base**	Displays the Base dialog box to set the numeric base (decimal or hexadecimal) of the values displayed in the interpreted views.
	Font	Displays the Font dialog box to set the type, typeface, and size of the font used for most of the views windows. The Binary and Hexadecimal view windows are not affected by the font selection.
	Interpretation	Displays the Interpreted view option dialog box to display either the length or position of the field in the bitstream. This information is displayed in interpreted views and available only in Linear format.
	Output Message in File	Automatically saves analyses results error messages to a file. You can specify the path using the Directories command.

Table 2–2: Menu selections (cont.)

Menu	Selection	Description
	Directories	Sets the default path for saving messages to file and for saving and loading configuration files (Configuration Directory).
	Automatic Analysis	Opens a dialog box to select the analyses performed (Syntactic, Semantic, or both) when you select Automatic from the Analysis menu.
	Read Configuration	Displays the Read Configuration dialog box to specify which previously saved configuration file (*.acf) to load into the current analyzer session.
	Display in Frames	Sets the unit of measure to frames in the Wave Editor
	Display in Milliseconds	Sets the unit of measure to milliseconds in the Wave Editor
	Save Configuration	Displays the Save Configuration dialog box to save the current analyzer configuration to file (*.acf). You can transfer the file to another system or reload it at a later time.
	Set Default Configuration	Loads the default configuration file.
Window	**Cascade**	Displays the open view windows on top of one another, enlarging the Main Characteristics window if necessary.
	Tile	Fits the open view windows to the application window.
	Arrange Icons	Arranges all minimized windows from left to right across the bottom of the application window.
	Close view	Closes the active audio stream file.
	Close all	Closes all view windows.
	Add view	Opens a submenu to create an additional view of the current data. The submenu changes depending on your selection. Same as the Add View button on the Upper Toolbar.
Help	**Contents**	Opens the Dolby Digital Audio Stream Analyzer Online Help. Select an analyzer help topic or click on a tab to the view the index or specify a search topic.
	Using help	Opens the Windows Online Help window. Select a Windows help topic or click on a tab to the view the index or specify a search topic.
	About Audace	Displays the analyzer version number and copyright information.

Audio Stream Analysis

This section explains how to open, decode, analyze, save, and print audio stream files.

Extracting an Audio Elementary Stream from a Transport Stream

To extract and analyze an audio elementary stream encoded in a transport stream file, use the following procedure:

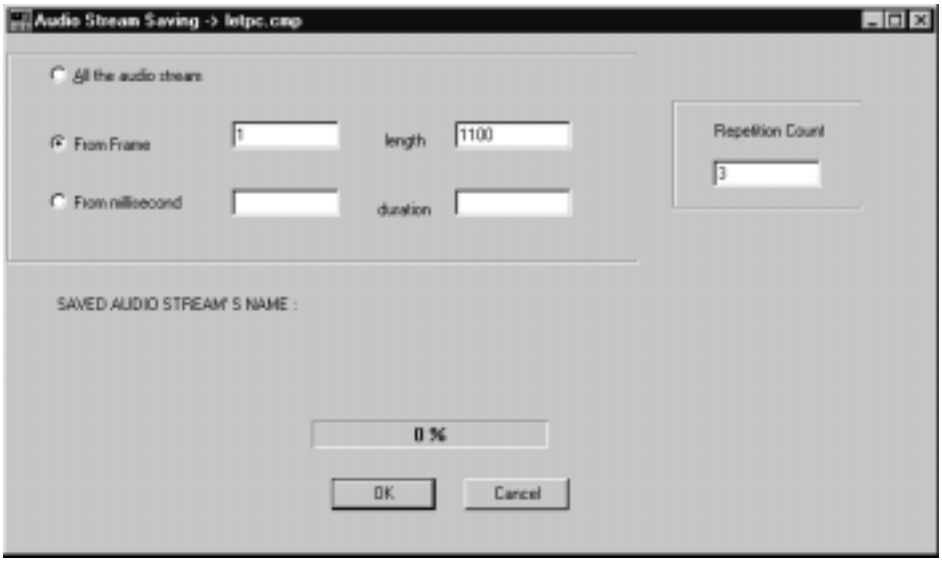
1. Identify the audio stream PID for the packets of interest. If necessary, examine the transport stream first with the MTS 300 MPEG-2 DVB/ATSC System Analyzer (Deferred-Time Analyzer application).
2. Select **Open** from the File menu.
3. Select the appropriate file from the Open dialog box.
4. Enter the PID of the packets that contain the audio stream.

NOTE. *If you have the Tektronix MTS 300 MPEG-2 DVB/ATSC System Analyzer, you can open the Dolby Digital Audio Stream Analyzer to analyze Dolby elementary streams. From the Deferred-Time Analyzer Hierarchic View, right-click the Dolby audio icon and select* ***AC-3 Stream Analyzer*** *from the pop-up menu.*

Saving Audio Stream Files. You can save AC-3 audio stream files as *.AC3 files.

To save all or part of an audio stream file, use the following procedure:

1. Open an AC-3 audio stream file or other file containing an AC-3 audio stream (see *Audio Stream File Types* on page 1–1).
2. Make sure that the Frame view is active.
3. Select **Save as** from the File menu or click the **Save As** button on the Upper Toolbar.



4. In the Audio Stream Saving dialog box, specify what portion of the stream you want to save by selecting one of the following options:

   - *All the audio stream.* This option is the default for storing encoded streams and will save the complete audio stream.
   - *From frame.* This option allows you to save a specific portion of the audio stream. Enter the starting frame in the From Frame text box and the length of the frame in the length text box.
   - *From milliseconds.* This option allows you to save a specific portion of the audio stream. Indicate the starting time in the From millisecond text box and number of the milliseconds in the duration text box.

5. Select the number of times you want to save the audio data in the Repetition Count text box, and then click **OK**. For each repetition greater than one, the audio stream or the selected portion will be appended to the first repetition.

6. You are prompted for the audio stream file name with the following dialog box.

7. Select or type the file name and extension, and then select **OK**.

Analyzing Audio Streams

You can analyze audio streams for errors in the following ways:

- Syntactic Analysis. Search for errors in the value(s) of a structure.
- Semantic Analysis. Search for errors in the MPEG structure.
- CRC Check. Search for errors in transmission or decoding.
- Automatic Analysis. Perform a series of analyses of an entire stream.

Syntactic Analysis. Syntactic analysis detects when a field has a value disallowed by the Dolby AC-3 standard, independently of any other field (typically a bad frame header). Some fields can have a reserved value, which could make some decoders crash. When no default value is defined in the standard, a reserved value is considered a syntax error and will generate an error message.

Syntactic analysis is available when the active view contains syntactical analyzable material (for example, the Delta Bit Allocation view). Otherwise, the menu command is unavailable, for example, when the Main Characteristics view is active.

The analyzer can perform syntactic analyses on a specific MPEG2 AC-3 audio stream syntax or on the complete stream.

To analyze a specific syntax, do the following:

1. Display the interpreted view window for the syntax you want to check. For example, in the Frame view, double-click on the **BSI** icon to analyze the Bit Stream Information syntax.

2. To provide a complete inventory of each incorrect field, select **Syntactic** from the Analysis menu. The analyzer performs syntactic analysis on the open window. The frame number in the Top Line of the interpreted view cycles through the frames of the audio stream to indicate that the analysis is being performed. If you want to stop the analysis, press **ESC**. Detected syntax errors are displayed in a Message for... window.
3. To display one error at a time, select **Next error** in the Edit Toolbar display.
4. In the displayed SI or BSI view, the errors are displayed in red. Double-click on the error to display an explanation.

To analyze the entire stream, perform an automatic analysis with the **Syntactic** analysis option checked (see *Automatic Analysis* below).

Semantic Analysis. Semantic analysis checks the coherence of all AC-3 parameters as indicated by the standard. You can perform semantic analyses only from the Frame view.

To perform a semantic analysis, use the following procedure:

1. Navigate to the Frame view.
2. Select **Semantic** from the Analysis menu.
3. The analyzer performs a semantic analysis of the entire stream and reports any errors in an error message window.
4. Double-click an error message to display the interpreted view of the element in error.

To analyze the entire stream, perform an automatic analysis with the syntactic analysis option checked (see *Automatic Analysis* below).

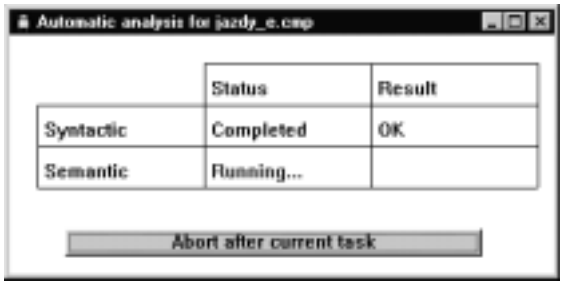
Automatic Analysis. You can use the Automatic Analysis function to perform syntactic analysis, semantic analysis, or both. This function is only available when the Frame view is active.

To perform an automatic analysis, use the following procedure:

1. Select which analyses to perform:
   a. Select **Automatic analysis** from the Options menu.
   b. In the resulting dialog box, select Syntactic, Semantic, or both types.
   c. Click **OK**.
2. Be sure that the Frame view is active.
3. Select **Automatic** from the Analysis menu.

4. The analyzer performs the analyses that were selected in the Options menu. If Syntactic is selected, a syntactic analysis is performed on the complete audio stream.

5. A message window displays the results of the analysis. If the analyzer detects errors, *Errors* appears in the right column. Double-click the word **Errors** to display the error message window.



CRC Error Check. CRC information is displayed in two ways:

- Each time you open a frame, the analyzer performs a CRC analysis and displays the result at the bottom of the Frame view. For more information about this display, see *Frame View* on page 2–9.
- The AC-3 stream contains two CRC words per frame. You will find CRC1 in the results of the first five-eights of the frame; CRC2 occurs in the results of the last three-eights of the frame. For an interpreted view of CRC1, double-click the **SI** icon to open the CRC view. For an interpreted view of CRC2, double-click the **CRC** icon to open the CRC view.

  For more information about this display, see *Cyclic Redundancy Check* on page 3–16.

Decoding Audio Streams

You can decode an audio stream and view the audio waveform using graphical views. See the following pages in the *Reference* section for additional information:

- Dialog Normalization graph — See page 3–16
- Heavy Compression graph — See page 3–17
- Dynamic Range graph — See page 3–17

To generate a stream summary, use the Stream Summary command from the Decode menu. For more information, see *Stream Summary* on page 3–17.

Printing Audio Stream Data

You can print any of the view windows except the Main Characteristics view. To print the information displayed in a view window, use the following procedure:

1. Specify the page layout by selecting **Printer setup** from the File menu. Make appropriate selections for paper size and source, orientation, and margins from the Page Setup dialog box.
2. Specify the printer connections by selecting the **Printer** command button, and then making the appropriate printer and printer properties selections (see your Windows documentation).
3. Return to the view window you want to print and select **Print** from the File menu.
4. In the Print dialog box, make selections and print the contents of the active view window.

NOTE. *You may need to change the font and page margins to print all the information displayed in some of the interpreted view windows.*

Loading a Configuration File

You can load a previously saved configuration file (.acf file) into the current analyzer session by selecting the **Read configuration** command from the Options menu. This operation will affect the base, font, and interpretation parameters.

Reference

Reference

This section provides detailed information on the Dolby Digital Audio Stream Analyzer. and is organized into the following subsections:

- *Binary and Hexadecimal Views*. Describes how you can use these views to display and interpret audio stream data.
- *Interpreted View Displays*. Describes how to interpret tabular and linear display formats.
- *Interpreted Frame Views*. Describes how to open an interpreted view of any element in the Frame view.
- *Graphical Views*. Describes how to generate normalization, compression, and dynamic range graphs.
- *Error Messages*. Describes how to interpret the syntactic and semantic analyses error reports.
- *Configure Analyzer Parameters*. Describes the Options menu selections.

Binary and Hexadecimal Views

The Binary and Hexadecimal windows display the audio bitstream for the MPEG element indicated in the top line of the interpreted view window.

Use one of the following techniques to display a Binary or Hexadecimal view:

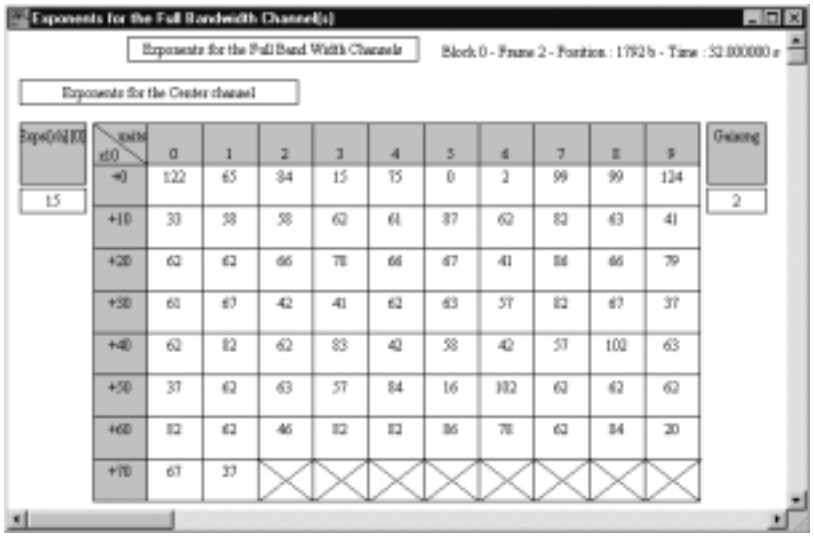
- From an interpreted view, click the **Add view** Toolbar button, and then select either **Binary** or **Hexadecima**l from the submenu.
- From an interpreted view, select **Add view** from the Window menu, and then select either **Binary** or **Hexadecimal** from the submenu.

The Edit Toolbar is available for both views, so you can step through the binary or hexadecimal information for other frames. When you select **Next error**, the analyzer looks for syntactic errors and not semantic errors.

Interpreted View Displays

These displays allow you to interpret the values of the various AC-3 elements. Two types of displays are available: tabular and linear. Both displays are interactive, allowing you to determine which signal you are viewing when you examine the syntax.

Tabular Display. Tabular displays are interpreted views that present the extracted information in tabular format, such as the following view.



In addition to the information common to all interpreted views, tabular views have the following unique features:

- Information is presented in table format.
- Row and column headings provide access to descriptions of the displayed syntax.
- Data displayed in the cells is one of two types: actual values for AC-3 parameters or indices for a set of values from the standard.
- Red values indicate syntax errors.

You can double-click a row or column heading to display a description of the contents. You can also double-click a cell to interpret its data. To display data in decimal or hexadecimal format, press the **F2** function key.

When you double-click a cell or heading, a message box appears. The Title Bar of the message box indicates the specific syntax displayed. You can position the box anywhere within the view window by clicking and dragging the Title Bar of the box. Click anywhere outside of the box to dismiss it.

Linear Display. Linear displays are interpreted views that present the extracted information in a series of rectangles, such as the following view.

In addition to the information common to all interpreted views, linear views have the following features:

- Large rectangles display parameter names. You can double-click a large rectangle to display a message box containing the parameter description. You can move this message box anywhere within the view window by clicking and dragging the Title Bar of the box. Click anywhere outside the box to dismiss it.
- Shaded large rectangles denote important AC-3 parameters.
- Small rectangles display the parameter value. You can double-click a small rectangle to display a message box containing an interpretation of the displayed value. Click anywhere outside the displayed message box to dismiss it.
- Values displayed in red indicate syntax errors.

You can display parameter values in decimal or hexadecimal format. To switch between the two, press the **F2** function key. Alternatively, select **Base** from the Options menu, and then make the selection from the dialog box that is displayed.

Linear displays can indicate the position or length of a parameter in the bitstream. When enabled, this information appears below the small rectangles. You can determine which type of information to display, if any, using the following procedure:

1. Select **Interpretation** from the Options menu.
2. Select **Position** or **Length**, or deselect both options.
   - Position indicates the position in the bitstream of the first bit of the parameter. Position is relative to the first bit in the displayed element.
   - Length is the length in bits of the parameter.

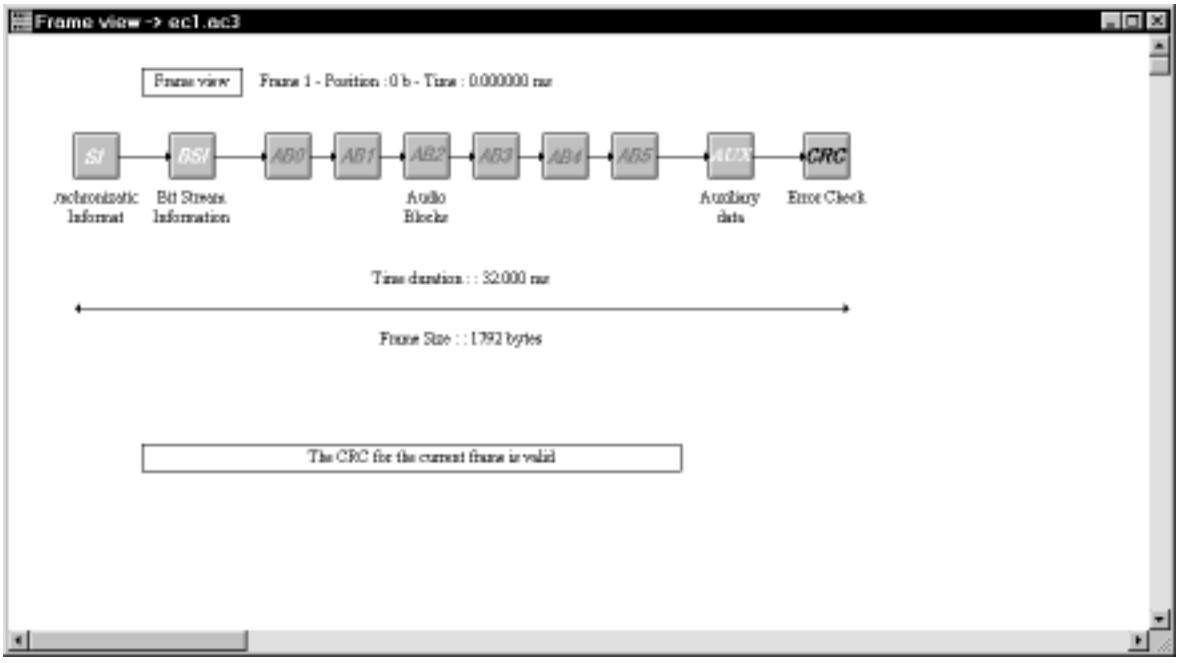
Each time you start a new session, the analyzer uses the Interpretation option selected from the previous session. The default Interpretation option displays neither length nor position information.

Using the Toolbar to Navigate . You can use the Edit toolbar to navigate through the elements of an audio stream file. (See *Edit Toolbar* on page 2–2.) In the Frame interpreted view, the ▶ button takes you to the displayed element in the next frame. In an Audio Block view, the ▶ button takes you to the next item or block.

In the interpreted view, the analyzer looks for syntactic errors (not semantic errors) when you click the **Next error** button in the Edit toolbar. (The Edit toolbar is inactive in the Frame view.) If you select **Next error** while the CRC interpreted view is displayed, the analyzer displays the next detected CRC error.

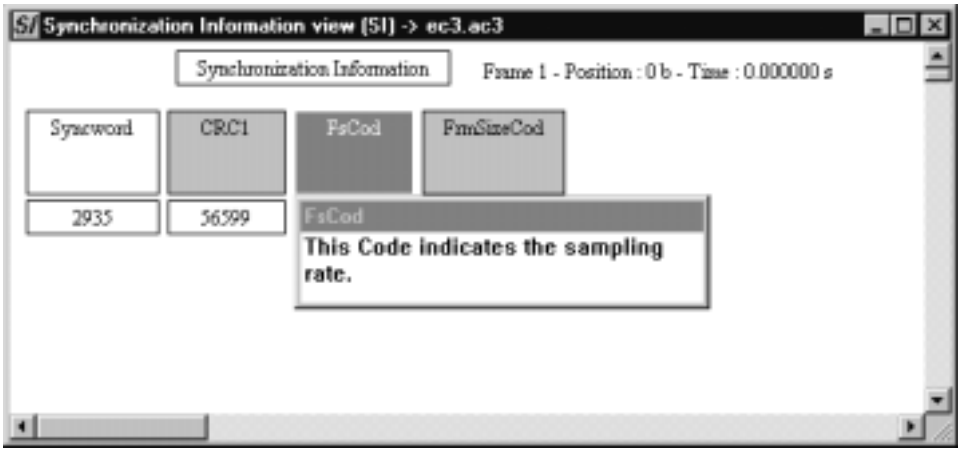
Interpreted Frame Views

To open an interpreted view of any element in the Frame view, double-click the icon of interest. Double-click any resulting cell to read an interpretation of the data for that cell.



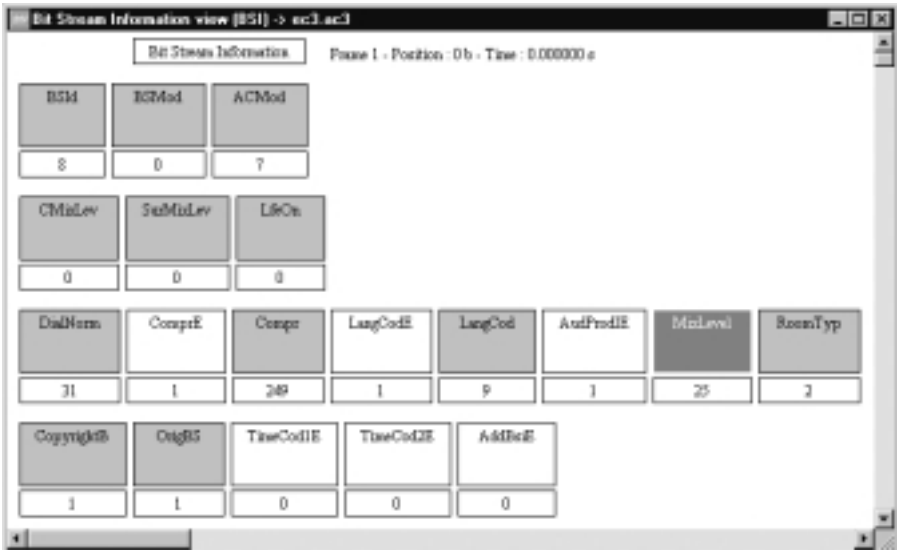
Synchronization Information (SI) View

Double-click the **SI** icon from the Frame view to display a graphical representation of the Synchronization Information. This view uses a linear display.



Binary Stream Information (BSI) View

Double-click the **BSI** icon from the Frame view to display a graphical representation of the Binary Stream Information. This view uses a linear display.



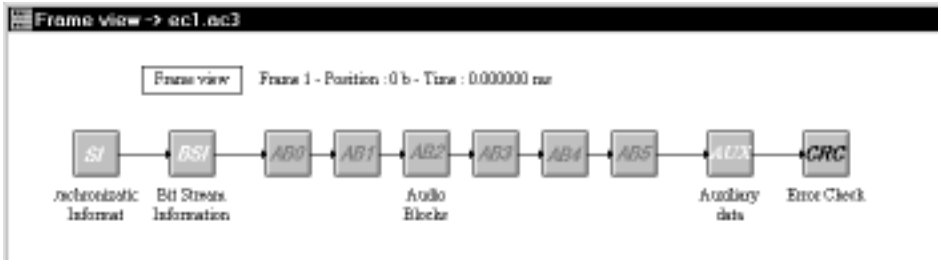
The BSI view displays several fields of information, depending on the mode. Optional field indicators (like ComprE, AudProdIE) appear in white on the screen. Data found in the additional field cannot be displayed, you must click the data area to open a raw view window.

Double-clicking the large rectangle identifies the field data. (The format displayed depends on the frame from which you accessed the Auxiliary Data interpreted view.) Double-clicking the small rectangle displays the message Bit

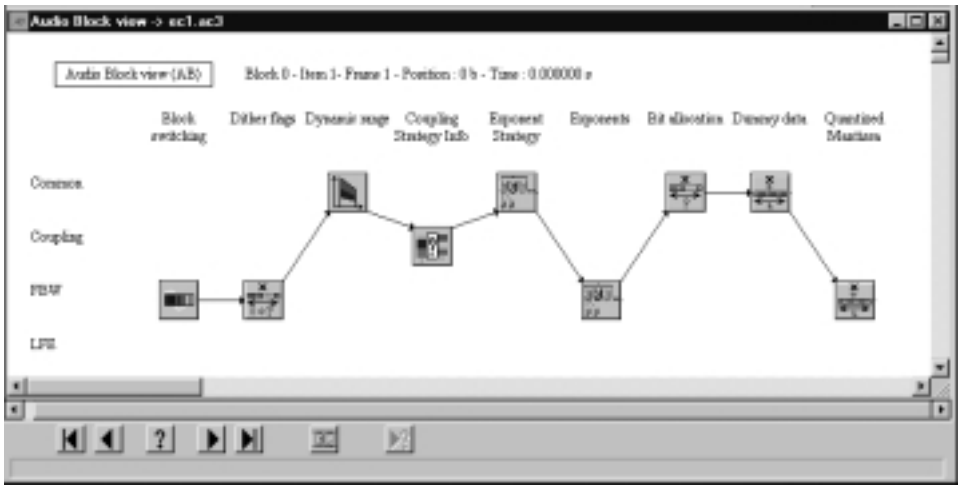
value. In order To use the Next error button on the Edit toolbar, display the bitstream first by double-clicking on the large rectangle.

Audio Block Views

Double-click an Audio Block icon (AB0 – AB5) from the Frame view to display the Audio Block view.



Double-click an Audio Block view icon to display an interpreted view window of detailed information for the current frame. Double-click any resulting cell to read an interpretation of the data for that cell.

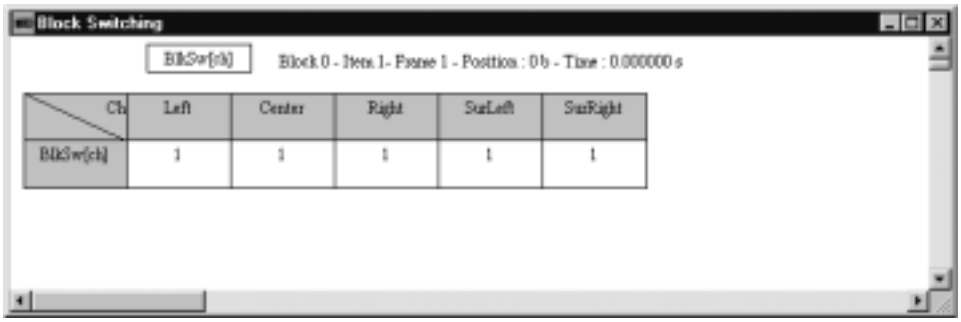


The following section discusses the individual Audio Block interpreted views.

Block Switching View. This view displays a block switching flag for each full bandwidth channel (a maximum of five channels). These flags indicate whether the current audio block was split into two sub-blocks during transformation from the time domain into the frequency domain.

The following AC-3 data is displayed:

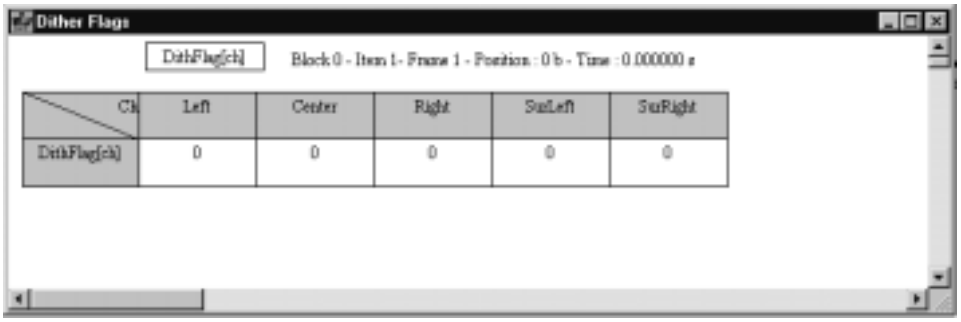
- *BlockSw* (for each full bandwidth channel)



Dither Flags View. This view displays a dither flag for each full bandwidth channel (a maximum of five channels).

The following AC-3 data is displayed:

- *DithFlg* (for each full bandwidth channel)



Dynamic Range Control View. This view displays the current frame fields; data is common to all channels. These fields may also be traced in the Dynamic Range graph (see page 3–17), in which case the unit is a block instead of a frame.

The following AC-3 data is displayed:

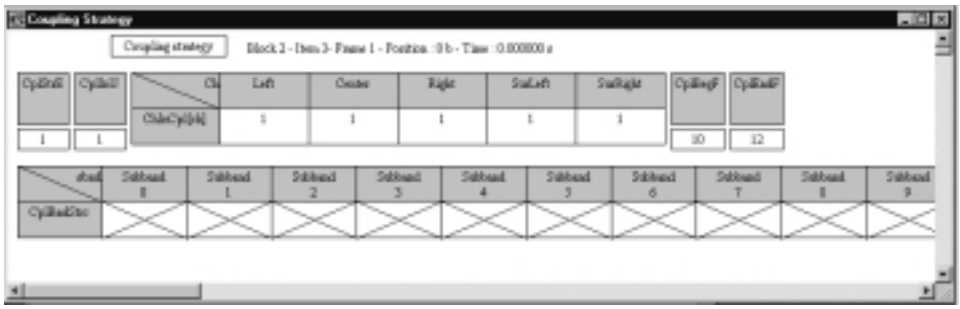
- *DynRngE*
- *DynRng*

- *DynRngE*
- *DynRng2*

Coupling Strategy Info View. This view displays coupling strategy and channel data for each full bandwidth channel.

The following AC-3 data is displayed:

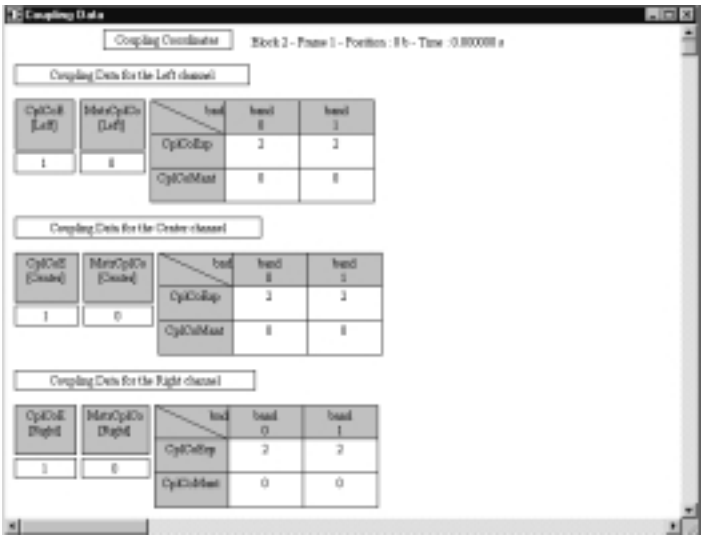
- *CplStrE*
- *CplInU*
- *ChInCpl* (for each channel)
- *ChsFlgInU*
- *CplBegF*
- *CplEndF*
- *CplBndStrc* (for each coupling frequency sub-band)



Coupling Data View. This view displays coupling channel data for each full bandwidth channel. In the upper array of this view, the length of the fields or the relative position to the beginning of the syntactic portion is given in the field interpretation (not shown).

The following AC-3 data is displayed:

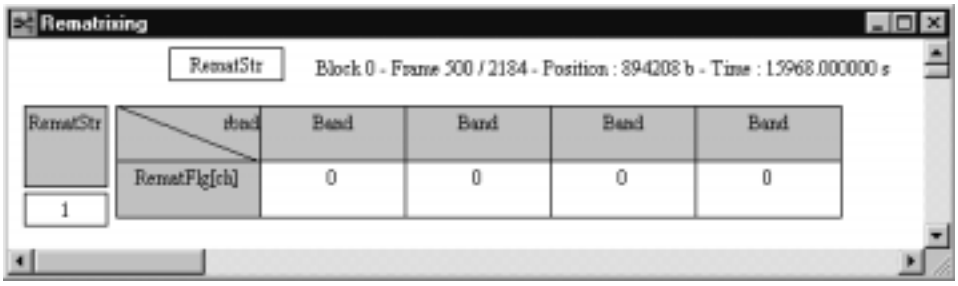
- *CplCoE* and *MstrCplCo* (for each channel)
- *CplCoE[ch][bnd]* (coupling coordinates exponent). Represented in a two-dimension array, up to 18 bands are displayed; unused bands are crossed out.
- *CplCoMant[ch][bnd]* (coupling coordinates mantissa). Represented in a two-dimension array, up to 18 bands are displayed; unused bands are crossed out.
- *PhsFlg* (for each coupling band up to 18)



Rematrixing View. This view displays data about full bandwidth channels only.

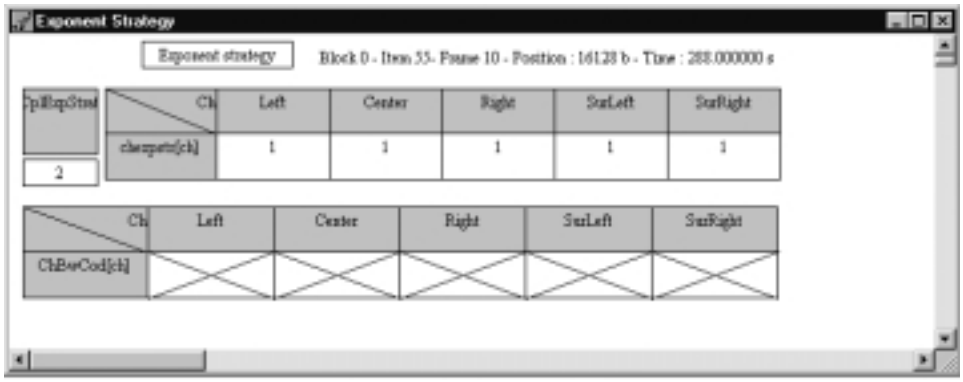
The following AC-3 data is displayed:

- *RematStr.* If *Rematr* is on, the array of rematrixing flags is displayed (*RematFlg[ch]*).



Exponent Strategy View. This view displays the following AC-3 data:

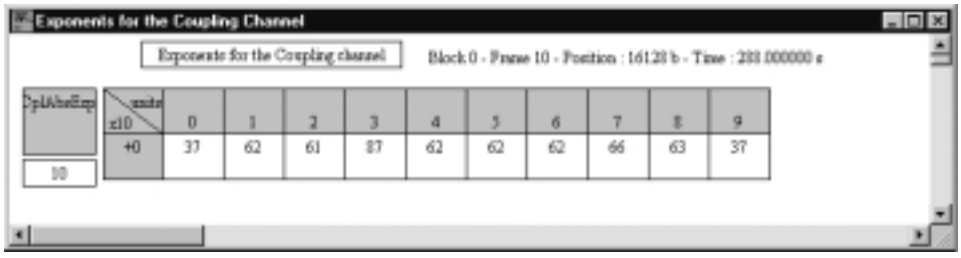
- *CplExpStrat* (reuse, D15, D25, D45)
- *chexpstr* (for each channel)
- *LfeExpStr*
- *ChBwCod[ch]* (channel bandwidth code)



Exponents View. There are three exponents views; one for each channel type listed along the left side of the Audio Block view window. Icons for one or more of these channels appears in the Audio Block view.

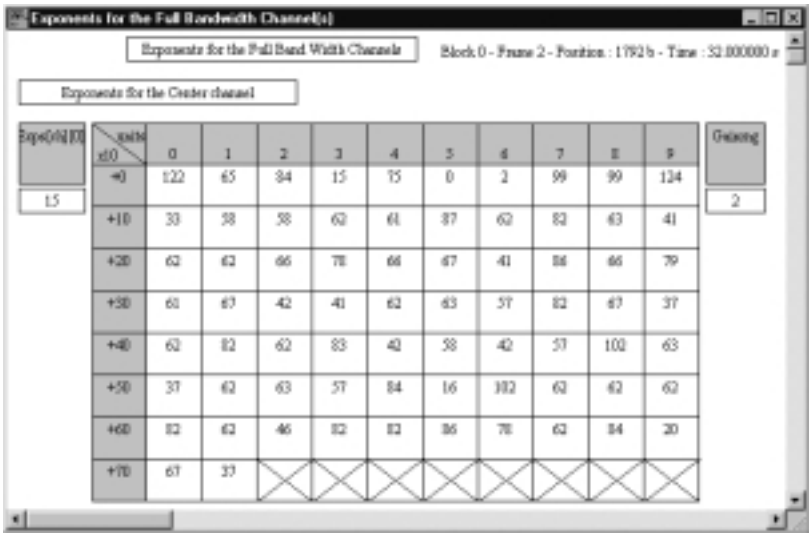
Exponents for the Coupling Channel. This view displays the following AC-3 data:

- *CplAbsExp* (coupling absolute exponent)
- *CplExps* (for each group of three exponent values for the coupling channel)



Exponents for the Full Bandwidth Channel(s). This view displays the following AC-3 data:

- *Exps[ch][0]* (absolute exponent values)
- *Exps[ch][grp]* (values of each group for the other channels: 85 columns)
- *Gainrng[ch]* (channel gain range code)

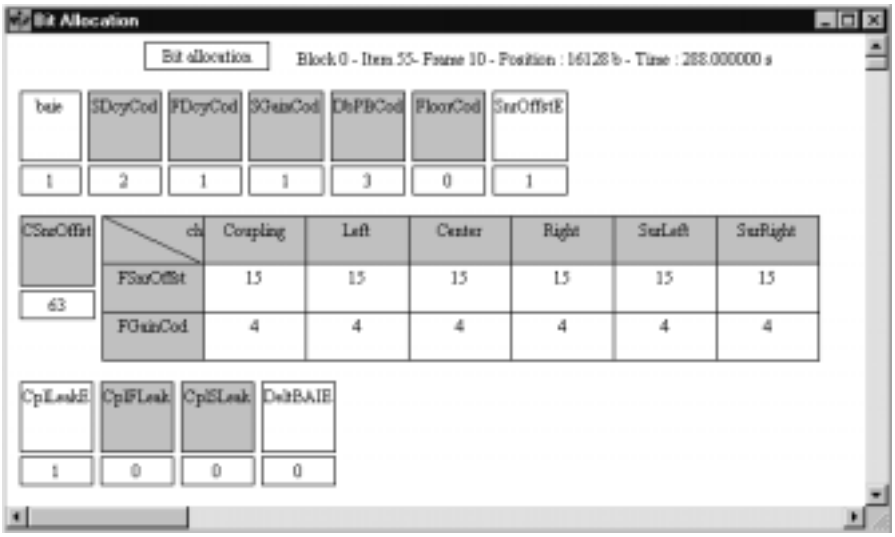


Exponents for the LFE channel. This view displays the following AC-3 data:

- *LfeExps[0]* (absolute initial exponent)
- *LfeExps[gr]* (values of each group for the LFE channel *gr*)

Bit Allocation View. This view displays the following AC-3 data:

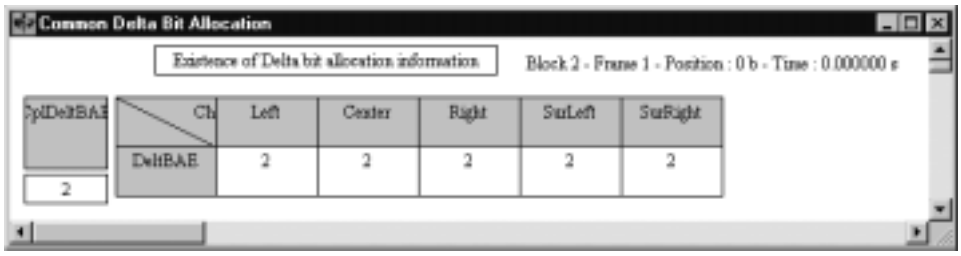
- *baie, SDcyCod, FDcyCod, SGainCo, DbPBCo, FloorCod, SnrOffstE*
- *CSnrOffst*
- *FSnrOffst*
- *CplFSnrOffst, CplFGainCod*
- *FSnrOffst* and *FGaincod* (for each channel)
- *LfeFSnrOffst, LfeFGainCod*
- *CplLeakE, CplFleak, CplSLeak*
- *DeltBAIE* (Delta Bit Allocation Information)



Delta Bit Allocation View. There are three types of Delta Bit Allocation views. Depending on the audio stream file, one or more of these icons may appear in the Audio Block view.

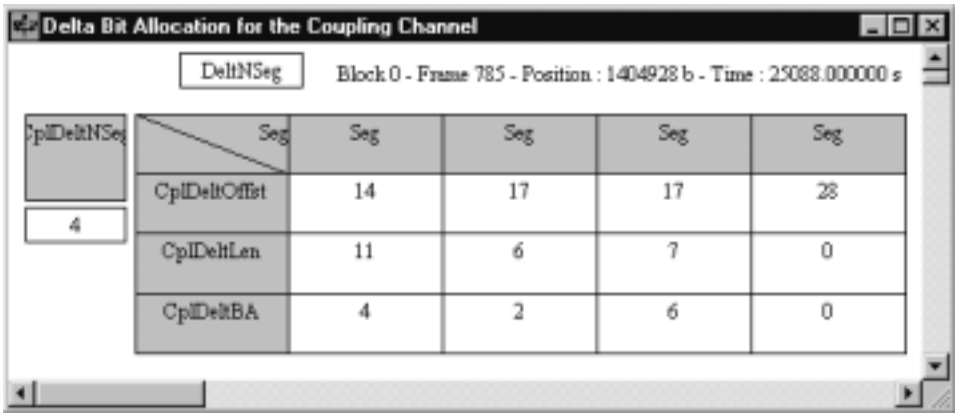
Common Delta Bit Allocation. This view displays the following AC-3 data:

- *CplDeltBAE*
- *DeltBAE[ch]*



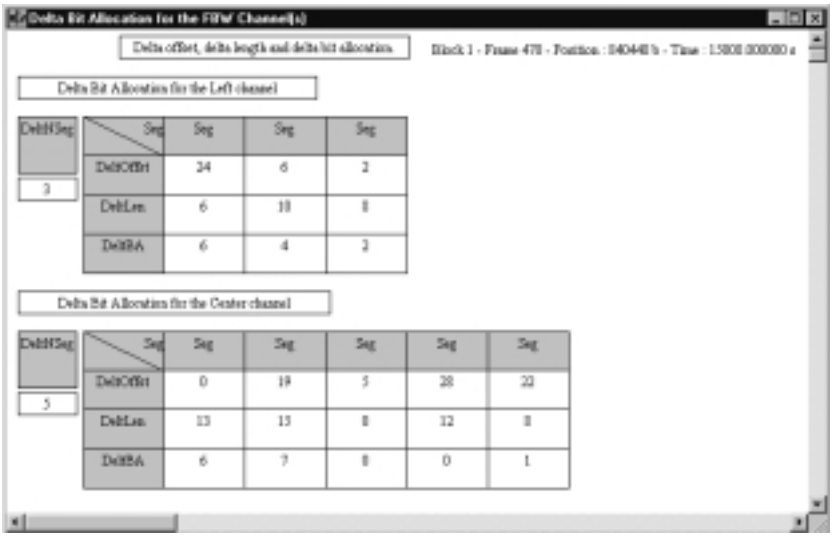
Delta Bit Allocation for the Coupling Channel. This view displays the following AC-3 data:

- *CplDeltNSeg*
- *CplDeltOffst[seg*
- *CplDeltLen[seg]*
- *CplDeltBA[seg]*



Delta Bit Allocation Information for FBW Channel(s). This view displays the following AC-3 data for each full bandwidth channel:

- *DeltNSeg[ch]*
- *DeltOffst[ch][seg]*
- *DeltLen[ch][seg]*
- *DeltBA[ch][seg]*



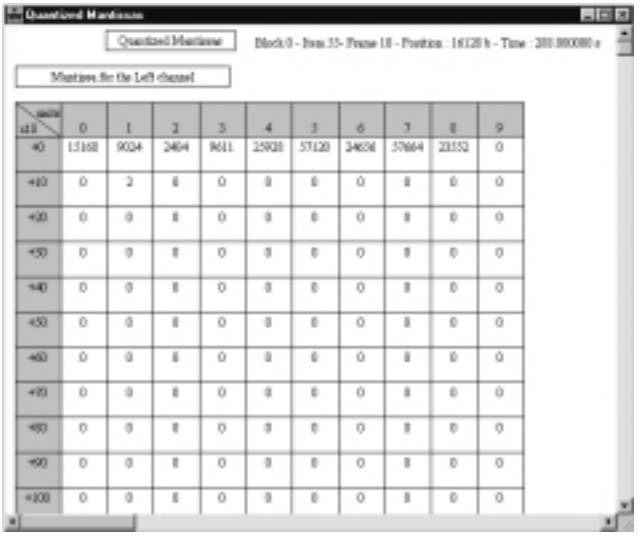
Dummy Data View. Dummy data is common to all channels. This view displays the following AC-3 data:

- *SkipLE*
- *SkipL*
- *SkipFld*

Quantized Mantissas View. The mantissa view is considered a common view because the channel order is standard: full bandwidth coupled channels, followed by the coupling channel and full bandwidth non-coupled channels, and finally, the LFE channel. There is a matrix for each channel type and a separate LFE mantissa view. Order of appearance in the stream is respected:

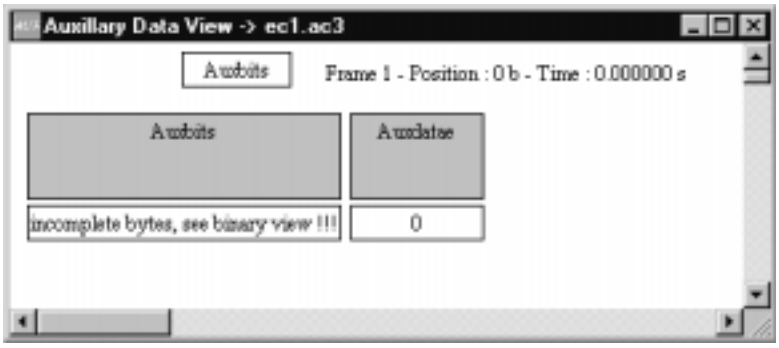
This view displays the following AC-3 data:

- *ChMant[ch][bin]* (full bandwidth coupled channels)
- *CplMant[bin]* (coupling channel)
- *ChMant[ch][bin]* (full bandwidth non-coupled channels)
- *LfeMant[bin]*



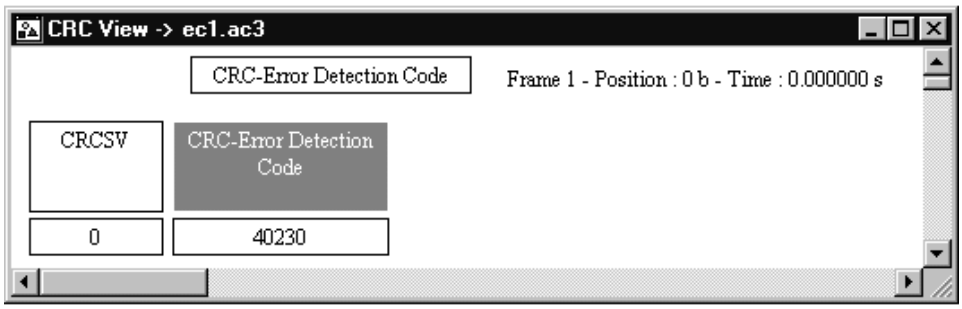
Auxiliary Data (AUX) View

Double-click the **AUX** icon in the Frame view to display a graphical representation of the auxiliary data view. This view uses a tabular display.



Cyclic Redundancy Check (CRC) View

Double-click the **CRC** icon from the Frame view to display a graphical representation of the CRC error syntax. This view uses a linear display.



The small rectangle in the CRC error interpreted view displays the CRC value. Red values indicate errors. Display other CRC errors by selecting the **Next error** button in the Edit toolbar.

Graphical Views

You can plot the following types of graphs with the Dolby Digital Audio Stream Analyzer: Dialog Normalization, Heavy Compression, Dynamic Range. The analyzer plots the stream element field values on the vertical axis and their corresponding frame numbers on the horizontal axis. If you need to abort during the graphing process, press the **ESC** key.

After the analyzer plots the graph, use the Edit Toolbar to navigate through the blocks, items, and frames.

Dialog Normalization Graph

This graph is available only from the Frame view.

To generate the Dialog Normalization graph, do the following:

1. Be sure that the Frame view is active.
2. From the Decode submenu select **Graph**; then select **Dialog Normalization** from the submenu.
3. Enter a number to specify at which frame to start the graph.
4. Enter the number of frames to plot.
5. Click **OK**. The displayed graph shows the frame numbers you specified on the horizontal (X) axis and the dialog normalization values on the vertical (Y) axis. Interpreted values are represented in decibels.

Heavy Compression Graph

This graph is available only from the Frame view.

To generate the Heavy Compression graph, do the following:

1. Be sure that the Frame view is active.
2. From the Decode menu select **Graph**; then select **Heavy Compression** from the submenu.
3. Enter a number to specify at which frame you want the graph to start.
4. Enter the number of frames to plot.
5. Click **OK**. The displayed graph shows the frame numbers you specified on the horizontal (X) axis and the heavy compression values on the vertical (Y) axis. Interpreted values are represented in decibels.

Dynamic Range Graph

This graph is available only from the Audio Block view.

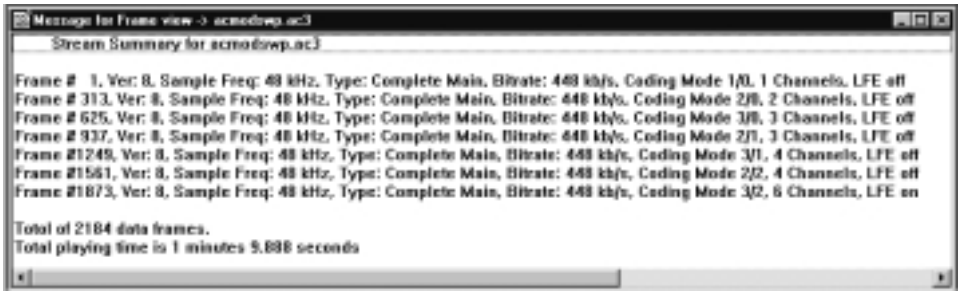
To generate the Dynamic Range graph, do the following:

1. Be sure that the Audio Block view is active.
2. From the Decode menu select **Graph**; then select **Dynamic Range** from the submenu.
3. Enter a number to specify at which frame you want the graph to start.
4. Enter the number of frames to plot.
5. Click **OK**. The displayed graph shows the frame numbers you specified on the horizontal (X) axis and the dynamic range values on the vertical (Y) axis. Interpreted values are represented in decibels.

Stream Summary

To generate a stream summary, be sure the Frame view is active, and then select the **Stream Summary** command from the Decode menu. The displayed information (such as version number, sample frequency, and type) is the same for all successive frames until new information appears.

For example, in the following illustration the displayed information is the same for frames 1 through 312.



Error Messages

When you perform a syntactic or semantic analysis, the analyzer generates an error report if it finds any incorrect fields.

To display error messages in the interpreted view, click the **Next error** icon on the Edit toolbar. This will advance through all the error messages, one at a time. The error values are displayed in red. You can double-click the value to display an explanation of the error.

Error Reports

Each line in the error report contains the following information:

- The frame number
- The block number
- The level of error
- The type of error (semantic or syntactic) in the case of Automatic analysis
- The name of the error (such as CRC error or synchronization error)

Saving Error Messages to a LOG File

To save error messages to a file, select Error messages from the Options menu. For additional information, see page 3–21.

Configure Analyzer Parameters

You can configure several analyzer parameters. You can also save the configurations and load them again (or transfer them to another analyzer), and you can reset the parameters to default conditions.

You can specify which analyses to perform when you select **Automatic** from the Analysis menu. You can also set the default directories that will be used when saving error messages to a file and when saving and loading configuration files.

NOTE. *The Options menu selections apply to the analyzer and not the audio streams displayed. Consequently, when an audio stream is opened, the information displayed reflects the current analyzer configuration. When you begin a new session, the analyzer loads the configuration options used during the previous session, saved when you exited.*

Saving and Loading Configuration Files

You can save the current analyzer settings to a configuration file that you can transfer to another system or reload at a later time.

Save. To save the configuration to a (*.acf) file, do the following:

1. Use the Options menu to select the desired Base, Font, and Interpretation settings.

Menu item	Description
Base	Use this selection to determine how the interpreted views display the audio elementary stream data. The analyzer can display data in either decimal or hexadecimal base. You can enter values only in decimal base.
Font	Use this selection to determine which font is in use in some analyzer view windows. The Main Characteristics, Binary and Hexadecimal view windows use a fixed font and are not affected by the font selection.
Interpretation	This selection allows you to display the length or the position of a field in the bitstream. This information is only available in linear display view windows. *Position* indicates the position in the bitstream of the first bit of the field. Position is relative to the to the first bit in the displayed structure. *Length* is the length of the field in bits.

2. Select **Save configuration** from the Options menu.
3. Select the desired path and enter a file name for the configuration file. You can also select an existing configuration file to write over.
4. Click **Save**. The .acf suffix will be added automatically.

Load. To load a configuration file, do the following:

1. Select **Read configuration** from the Options menu.
2. Select the configuration file that you want to load.
3. Click **Save**. The analyzer settings will be reset to the saved settings.

Set Default Directories. To assign a default directory for saving and retrieving configuration files, do the following:

1. Select **Directories** from the Options menu.
2. Under Configuration Directory, enter the path that you want to use when saving an loading configuration files.
3. Click **OK**.

Setting the Default Configuration

To reset the configuration parameters to the defaults, select **Set default configuration** from the Options menu and click **Yes** in the dialog box. The analyzer uses the defaults listed in the table below.

Menu item	Default setting
Base	Decimal
Font	Times New Roman, Regular style (no italics or bold), 9 point size
Interpretation	No length or position display selected

Saving Error Messages to a File

You can set the analyzer to automatically save error messages in a file.

To set the Default Directory, do the following:

1. Select **Directories** from the Options menu.
2. Under Message directory, enter the path to the directory where you want the error message file stored.

To save error messages, do the following:

1. Select **Output message in file** from the Options menu.
2. Perform an analysis. If the analyzer finds errors, it creates an error message file (*.log) in the directory you specified. Where * is the name of the AC-3 file.

To open an error message file, navigate in Windows to the specified directory and locate the *.log file. For example, the error file created is called *<xxx>.log*. Open the file in a word processing program, such as WordPad.

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