TELEDYNE LECROY
Everywhereyoulook™

Serial Audiobus Trigger, Decode, and Graph

Teledyne LeCroy's unique View Audio feature converts digital audio data into analog waveforms for easy digital audio analysis and debug.

Key Features

- **Supports:**
  - **– Inter-IC Sound (I^2S)**
  - **– Left Justified (LJ)**
  - **– Right Justified (RJ)**
  - **– Time Division Multiplex (TDM)**
- **Display digital audio serial data as an analog waveform**
- **Hex, Binary, Decimal, and dB Decoding**
- **Color-coded decode overlaid on the waveform is intuitive and easy to read**
- **Powerful and flexible conditional DATA triggering (=, not =, >, >=, <, <=, <>, in range, out of range)**
- **Trigger on glitch, clip, and mute**
- **Decode information expands as the timebase is adjusted or zoomed**
- **Convenient table displays up to 4 channels with quick "zoom to message" capability**
- **Quick search capability for specific messages**
- **Decode up to 4 simultaneous traces, including both right and left channels**
- **Decode does not require clock trace to be displayed**

Teledyne LeCroy's serial Audiobus trigger, decode, and graph package provides all the tools needed to properly analyze and debug digital audio buses. Teledyne LeCroy's solution addresses the I^2S, LJ, RJ, and TDM variations of the audio bus standard.

View Audio Waveforms

Teledyne LeCroy's Audiobus decode enables the unique View Audio feature that converts the digitally-encoded serial data audio signal into an analog waveform display. This provides an intuitive way to understand circuit problems causing clipping, glitches, and other anomalies in the audio circuit. It also helps show the effects of the audio signal before Digital Signal Processing (DSP). View Audio can be performed for up to four audio channels for conventional Left/Right audio, or home cinema applications (enabled by time division multiplexed audio buses).

The Most Intuitive Decode

Audiobus uses color-coded overlays on various sections of the protocol decode for an easy-to-understand visual display. This Teledyne LeCroy exclusive feature is intuitive to experienced audio engineers and especially useful for users new to the I^2S, LJ, RJ, or TDM Audiobus standards. The decode information condenses or expands depending on the timebase/ zoom ratio setting, simplifying both routine verification and complex troubleshooting. Choose to decode into Hex, Binary, Decimal, or dB formats.

Powerful Conditional Data Triggering

The Audiobus trigger can be configured for I^2S, LJ, or RJ variants. Powerful conditional triggering can be applied to either left or right channel data, while unique triggers like mute, clip, and glitch help isolate rare problems not easily detected by viewing decoded data alone.

POWERFUL TRIGGERING, INTUITIVE DECODING

Flexible Triggering

The Audiobus trigger can be configured for I²S, LJ, or RJ variants. Powerful conditional triggering can be applied to either left or right channel data, while unique triggers like mute, clip and glitch help to isolate rare problems not easily detected by viewing decoded data alone.

Simultaneously decode up to 4 serial data buses. When using the MSO option on WaveRunner® Xi or WaveSurfer® Xs the digital inputs D0, D1, D2, etc. can be used as the source for a serial data trigger and decode.

Convenient Table Display Summarizes Results

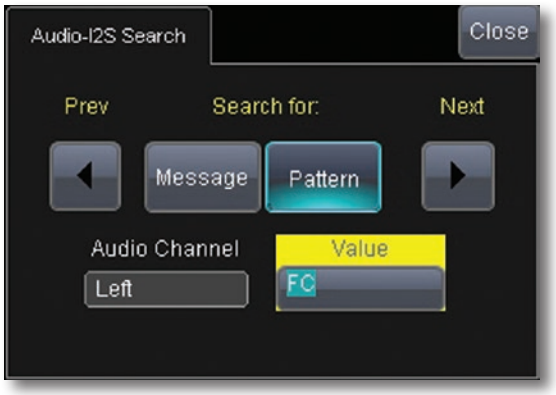
Turn your oscilloscope into a protocol analyzer with the Table display of protocol information. Custom configure the Table to display only the information you want, and export Table data to an Excel file. Touch a message in the table and automatically zoom for detail. In all cases, the Table never obscures your waveform data.

Idx	Time	Left	Right
1	-4.97662 ms	0x0b	0xfffffb3
2	-4.95395 ms	0x11	0x20
3	-4.93127 ms	0x17	0xffffff8
4	-4.90860 ms	0x1c	0x6b
5	-4.88591 ms	0x1f	0x78
6	-4.86325 ms	0x20	0xfffff92
7	-4.84058 ms	0x20	0x06
8	-4.81789 ms	0x1f	0x59
9	-4.79523 ms	0x1d	0xfffff8a

Display your values in an easy-to-understand table. Touch a row to zoom, or export to Excel with one button push.

Search and Zoom

Audiobus messages can be quickly located by searching on message or pattern. Pressing an arrow button advances the single zoomed message view one message to the right or left of the current message.



Search through long record of decoded data by entering the message or address you are looking for and clicking the right or left search arrows.

SPECIFICATIONS

	Audiobus TD	Audiobus TDG
	Definition	
Protocol Setup	DATA Select MSB or LSB (TDM only) Select Length (8, 12, 16, 18, 20, 24, 28, or 32-bits) Select Justification (Left or Right justified with respect to frame sync's transition) Select Start bit (TDM only) SYSTEM BIT CLOCK POLARITY Select data latch on Rising (1) or Falling (0) edge WORD SELECT (FRAME SYNCH) Select Word Length (8, 12, 16, 18, 20, 24, or 32-bits long) or Bit Length (one bit long) Select Frame Start (High or Low) Select Alignment (Together with Data Word (Right Justified or Left Justified), or 1-bit Earlier (I^2S)) Also, may select I^2S, Left Justified, Right Justified, or TDM default setups.	DATA Select MSB or LSB (TDM only) Select Length (8, 12, 16, 18, 20, 24, 28, or 32-bits) Select Justification (Left or Right justified with respect to frame sync's transition) Select Start bit (TDM only) SYSTEM BIT CLOCK POLARITY Select data latch on Rising (1) or Falling (0) edge WORD SELECT (FRAME SYNCH) Select Word Length (8, 12, 16, 18, 20, 24, or 32-bits long) or Bit Length (one bit long) Select Frame Start (High or Low) Select Alignment (Together with Data Word (Right Justified or Left Justified), or 1-bit Earlier (I^2S)) Also, may select I^2S, Left Justified, Right Justified, or TDM default setups.
	View Audio Waveform	
Format	N.A.	For I^2S, LJ, RJ: View Left, Right, or both analog channels For TDM mode: View channels 1–8
	Decode Capability	
Format	Hexadecimal, Binary, Decimal, dB.	Hexadecimal, Binary, Decimal, dB.
Decode Setup	Threshold definition required. Default is to Percent amplitude.	Threshold definition required. Default is to Percent amplitude.
Decode Input	Any analog Channel, digital Channel (MS-250 or MS-500), Memory or Math trace. Clock and/or FrameSynch/Word Select channel may be turned OFF and data will still decode (reduces screen clutter).	Any analog Channel, digital Channel (MS-250 or MS-500), Memory or Math trace. Clock and/or FrameSynch/Word Select channel may be turned OFF and data will still decode (reduces screen clutter).
# of Decoded Waveforms	**Up to 4 buses may be decoded at one time.** In addition, zooms can be displayed (with decoded information).	**Up to 4 buses may be decoded at one time.** In addition, zooms can be displayed (with decoded information).
Location	Overlayed over DATA waveform, on Grid.	Overlayed over DATA waveform, on Grid.
Visual Aid	Color Coding for right Channel and left Channel. (Ch 1–8 for TDM) Decode information is intelligently annotated based on timebase setting.	Color Coding for right Channel and left Channel. (Ch 1–8 for TDM) Decode information is intelligently annotated based on timebase setting.
	Trigger Capability	
Format	Hexadecimal, Binary.	Hexadecimal, Binary.
Trigger Setup	Trigger on DATA, Clip, Glitch, Mute.	Trigger on DATA, Clip, Glitch, Mute.
DATA Condition Setup	<=, <, =, >, >=, <>, in range, out of range, don't care.	<=, <, =, >, >=, <>, in range, out of range, don't care.
DATA Setup	Hexadecimal: # Data Bytes = 1 to 4. Data can be defined by nibble. Binary: Any combination of 0,1, or X for 8–32-bits in 4-bit increments.	Hexadecimal: # Data Bytes = 1 to 4. Data can be defined by nibble. Binary: Any combination of 0,1, or X for 8–32-bits in 4-bit increments.

continues

SPECIFICATIONS AND ORDERING INFORMATION

	Audiobus TD	Audiobus TDG
	Trigger Capability (cont'd)	
Bit Rates	Any. Auto-detected.	Any. Auto-detected.
Trigger Input	I^2S, LJ, and RJ only. Any analog channel or the EXT input. Clock or Frame Synch/ Word Select may be input to EXT to conserve available analog channels.	I^2S, LJ, and RJ only. Any analog channel or the EXT input. Clock or Frame Synch/ Word Select may be input to EXT to conserve available analog channels.
Trigger Design	Internal to oscilloscope, settable like any other oscilloscope trigger.	Internal to oscilloscope, settable like any other oscilloscope trigger.
	Search Capability	
Pattern Search	Search by message or pattern in hexadecimal formats.	Search by message or pattern in hexadecimal formats.
	Oscilloscope Capability	
Compatible With…	TD (Trigger and Decode) Option fully compatible with WaveMaster® 8 Zi, WavePro® 7 Zi, WaveRunner® Xi/Xi-A, and WaveSurfer® Xs/Xs-A.	TDG (Trigger, Decode and Graph) Option fully compatible with WaveMaster® 8 Zi, WavePro® 7 Zi, and WaveRunner® Xi/Xi-A

Ordering Information

Product Description	Product Code
Audiobus Trigger, Decode, and Graph Option for I^2S, LJ, RJ, and TDM for WaveMaster 8 Zi	WM8Zi-Audiobus TDG
Audiobus Trigger, Decode, and Graph Option for I^2S, LJ, RJ, and TDM for WaveRunner Xi/Xi-A	WRXi-Audiobus TDG
Audiobus Trigger, Decode, and Graph Option for I^2S, LJ, RJ, and TDM for WavePro 7 Zi	WPZi-Audiobus TDG
Audiobus Trigger and Decode Option for I^2S, LJ, RJ, and TDM for WaveMaster 8 Zi	WM8Zi-Audiobus TD
Audiobus Trigger and Decode Option for I^2S, LJ, RJ, and TDM for WaveRunner Xi/Xi-A	WRXi-Audiobus TD
Audiobus Trigger and Decode Option for I^2S, LJ, RJ, and TDM for WavePro 7 Zi	WPZi-Audiobus TD
Audiobus Trigger and Decode Option for I^2S, LJ, RJ, and TDM for WaveSurfer Xs/Xs-A	WSXs-Audiobus TD

Customer Service

Teledyne LeCroy oscilloscopes and probes are designed, built, and tested to ensure high reliability. In the unlikely event you experience difficulties, our digital oscilloscopes are fully warranted for three years, and our probes are warranted for one year.

This warranty includes:

- No charge for return shipping
- Long-term 7-year support
- Upgrade to latest software at no charge

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1-800-5-LeCroy
teledynelecroy.com

Local sales offices are located throughout the world.
Visit our website to find the most convenient location.

AudiobusTDDS-10jun13