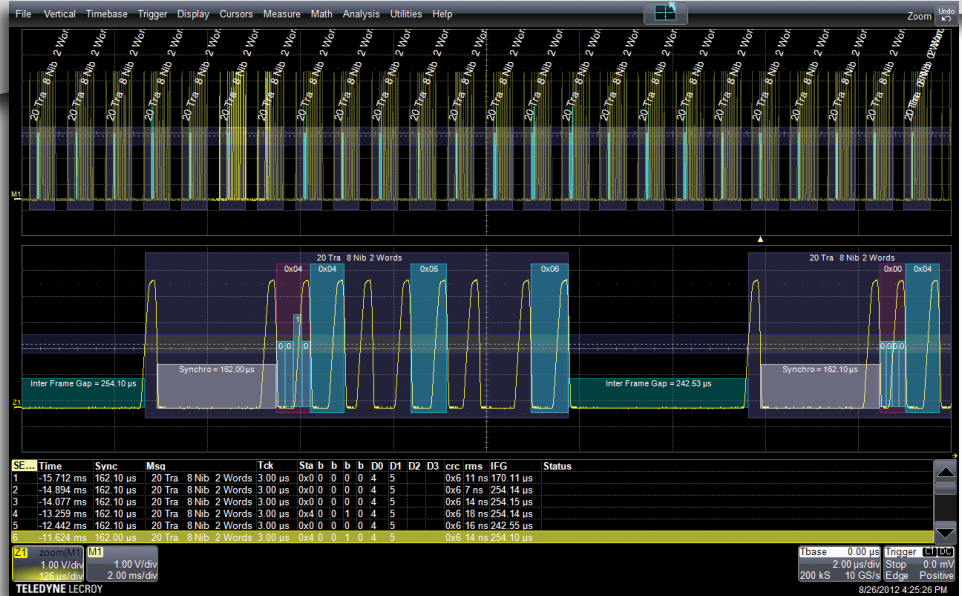# SENT
Serial Data Decode

Key Features

- **Flexible Payload Decomposition**

- **Decodes Bursts as Nibbles or Words**

- **Color-coded decode overlaid on waveforms is intuitive and easy-to-read**

- **Decode information expands as time base is adjusted**

- **Convenient table display with quick "zoom to message" capability**

- **Quick search capability for specific link layer frame content**

- **Supports Version 2008 and 2010**

- **Supports Fast and Slow Channel Decode and Analysis**

- **Extract and plot embedded SENT data using ProtoBus MAG Serial Debug Toolkit**

High-resolution SENT sensor and ECU message frames are intuitively decoded on the waveform, provided in an interactive table, and payload content search tools make debugging fast and effective.

Decode Annotation Complements Physical Layer Views

The SENT protocol layer is decoded and displayed directly on the physical layer waveform. Various sections of the protocol are color coded making it easy to isolate message frame content. Decode annotation, for both Nibble and Word decode formats, condenses or expands depending on the timebase/zoom ratio setting. Contents of both Fast Channel frames as well as assimilated Slow Channel frames make analysis of sensor communicaton fast and easy. A unique tool presents the decoded data payload values with choices in offsets and number of nibbles that match the message frame format.

Decode annotation provides the ability to view protocol traffic on the oscilloscope and verify that the link is alive and transmitting properly. It also aids in debugging problems

that are not solely analog or digital in nature, such as interoperability issues, uncertain error causes, and physical layer issues not evident with a protocol analyzer.

Convenient Table Display and Search

Deep oscilloscope acquisition memory provides long capture times of SENT sensor transmissions. Decoded information is conveniently shown in a table format, displayed with either Nibble or Word type detail, and contents of Fast and Slow Channels can be displayed together or individually. Specific message frame content can be easily scanned and searched. In addition, table data may be exported as a .csv file.

Support on Multiple Oscilloscope Platforms

The SENT decode option is available on a wide range of oscilloscope models from 200 MHz to 65 GHz.

SPECIFICATIONS AND ORDERING INFORMATION

SENT	
Definition	
Protocol Setup	Selection is provided for SENT versions 2008 and 2010 as well as source channels.
Decode Capability	
Format	Hexadecimal or Decimal.
Decode Setup	Viewing: Decode Type (Nibbles or Words); Physical Layer: Tick Time (400 nsec to 3 msec), Tick Time Tolerance (1% to 30%), Idle State (High or Low), Nibbles (5 or 8); Protocol Details: SENT Version (FEB 2008 or JAN 2010), New CRC (On/Off), Pause Pulse (On/Off); Decode Types: Nibbles or Words. Channel Selection: Fast Only, Slow Only or Both. For decode in "Words", "Fast Only" Channels has four fields available for Payload Interpretation (D0, D1, D2, or D3), includes controls to define Offset, Nibble and Order (MSB or LSB). For decode in "Words", "Slow Only" Channels has control for User Defined Tables, entered via a TXT file.
Decode Input	Any Analog Channel, Memory or Math Trace.
# of Decode Waveforms	Up to 4 buses may be decoded at one time. In addition, zooms can be displayed (with decoded information).
Location	Overlaid on SENT physical layer waveform, on Grid. (Note: Use multi-grid if there is more than one decoder ON).
Visual Aid	Color Coding for overall SENT Packet, Synchronization Pulse, Status and Communication Nibble, Reserved for Application Status, Serial Data Message Bits, Message Start, Data Nibbles, CRC, and Inter-Frame Gap.
Search Capability	
Pattern Search	When decoder set for "Nibbles", search for any of the following: Idx, Time, Sync, D0 (with hexadecimal value), NonData, IFG, Status; When decoder set for "Words", search for Idx, Time, Sync, Msg, Tck, Stat, b0, b1, b2, b3,D0, D1, D2, D3, crc, rms, IFG, Status and selection available for use of defining decimal or hexadecimal search value.
Other	
Compatible With...	Fully compatible with HDO4000 and HDO6000, WaveRunner® 6 Zi Series, WaveSurfer® Xs/Xs-A/Xs-B Series, WaveRunner® Xi/Xi-A Series, WavePro® 7 Zi/Zi-A Series, WaveMaster® 8 Zi/Zi-A Series, LabMaster 9Zi-A Series, and LabMaster 10Zi Series. Also available as an upgrade for WaveRunner 6000(A), WavePro 7000(A) and WaveMaster 8000(A).

Ordering Information

Product Description	Product Code
SENT Decode Options	
SENT Decode Option for HDO4000	HDO4K-SENTbus D
SENT Decode Option for HDO6000	HDO6K-SENTbus D
SENT Decode Option for WaveRunner 6 Zi	WR6Zi-SENTbus D
SENT Decode Option for WaveSurfer Xs/Xs-B	WSXs-SENTbus D
SENT Decode Option for WaveRunner Xi/Xi-A	WRXi-SENTbus D
SENT Decode Option for WavePro 7 Zi/Zi-A	WPZi-SENTbus D
SENT Decode Option for WaveMaster 8 Zi-A	WM8Zi-SENTbus D
SENT Decode Option for LabMaster 9 Zi-A	LM9Zi-SENTbus D
SENT Decode Option for LabMaster 10 Zi	LM10Zi-SENTbus D

Product Description	Product Code
Recommended Probe Accessories	
200 MHz, 3.5 pF, 1 MOhm Active Differential Probe, ±20 V	ZD200
1,400 V, 100 MHz High-Voltage Differential Probe	ADP305
1,400 V, 20 MHz High-Voltage Differential Probe	ADP300
500 MHz, 18 Ch, 2 GS/s, 50 Mpts/Ch Mixed Signal Oscilloscope Option	MS-500
250 MHz, 36 Ch, 1 GS/s, 25 Mpts/Ch (500 MHz, 18 Ch, 2 GS/s, 50 Mpts/Ch Interleaved) Mixed Signal Oscilloscope Option	MS-500-36
250 MHz, 18 Ch, 1 GS/s, 10 Mpts/Ch Mixed Signal Oscilloscope Option	MS-250

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