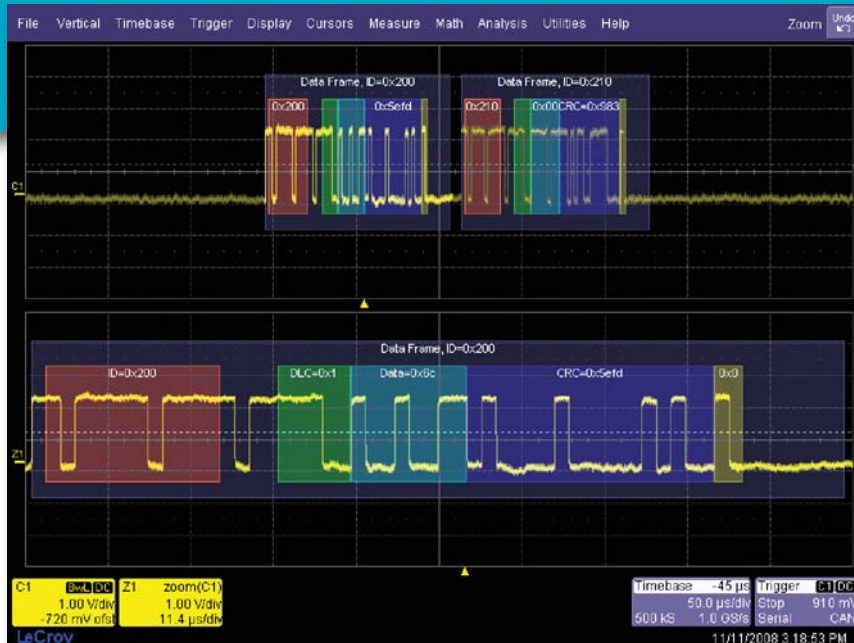


CAN Trigger, Decode and Measurement

Leading Features

- Comprehensive CAN trigger, decode and protocol measurements in a single instrument
- Flexible CAN trigger includes:
 - CAN Data
 - Remote Frames
 - Error Frames
- Powerful Conditional Frame ID and Data triggering (>, >=, <, <=, <>, In Range, Out of Range)
- Easily view the decoded signals with an intuitive color-coded decode overlay
- Measure performance and statistically analyze
- Graph and plot performance data
- Supports CAN signals with bit rates from 10 kb/s to 1 Mb/s
- Convenient table display with “zoom to byte” capability
- Quick search capability for specific



Trigger on CAN Frame IDs and Data, apply a color-coded, easy to understand decode over your CAN signal, perform bus timing measurements and extract data from the CAN message.

The CAN trigger, decode and measurement package is the solution for locating CAN Bus anomalies and debugging CAN Bus controllers and systems. It is unique in allowing correlation of physical layer signals with protocol layer data information. Having all of your information in one instrument will allow you to intuitively find problems that you weren't aware of, increase parts and systems reliability, save time and lower costs.

Built-in Oscilloscope Trigger Makes Setup Easy

Isolate specific CAN messages with the built-in oscilloscope trigger. All the triggering is done in the oscilloscope and setup is completely integrated into LeCroy's intuitive trigger menu.

The Most Intuitive Decode

Patented software algorithms deconstruct the waveform into protocol decode information, then overlay the decoded data on the

waveform. Depending on the timebase setting or the amount of zoom, the decode information is condensed or expanded to better assist in understanding events during short or long acquisitions. Various sections of the protocol such as ID, DLC, CRC, Data and Errors are color-coded to make it easy to understand. The decode operation is fast—even with long acquisitions.

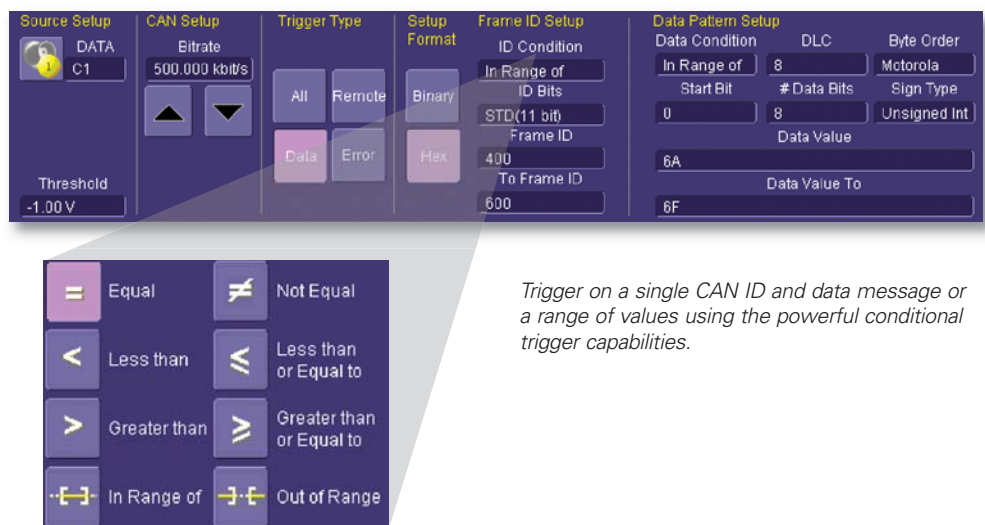
Measure and Plot Performance

Powerful measurements and sophisticated statistical, graphical, and plotting tools simplify CAN Bus debugging. Understanding CAN Bus system problems and performance is quick and easy.

Fast, Efficient CAN Test and Debug

Extensive Triggering

The flexible CAN Bus trigger allows trigger setup in multiple formats for a wide variety of setup conditions and is completely integrated inside the oscilloscope. The trigger will quickly locate and isolate specific Frame IDs, Remote Frames or Error Frames eliminating the need to search through a long capture for the right CAN message. Conditional triggering provides the ability to trigger on a range of Frame IDs or data messages.



Trigger on a single CAN ID and data message or a range of values using the powerful conditional trigger capabilities.

Timing and Bus Measurements

CAN specific measurement parameters allow you to quickly and easily characterize your CAN system and make gateway measurements. Use the CAN-CAN parameter to find the time between two messages on the bus or the CAN-Analog parameter to correlate CAN bus traffic to an analog signal. Use LeCroy's measurement statistics and histograms to understand the range of measurements on the CAN bus.

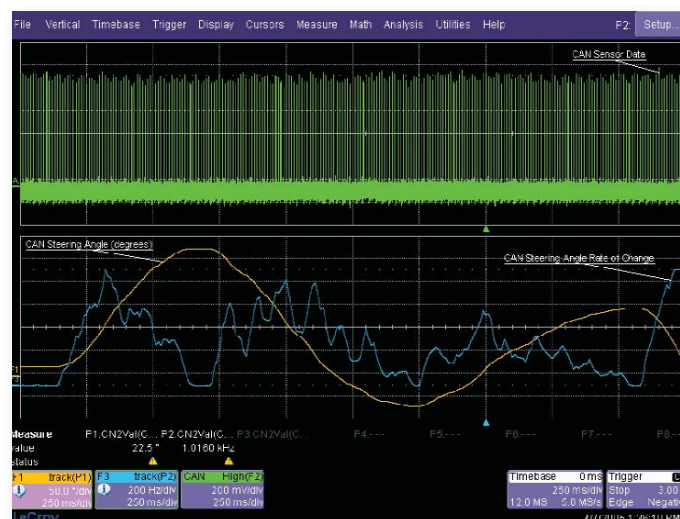
Measure	P1:CANLoad...	P2:CANMsg...	P3:CANMsg...	P4:CN2CNQ...
value	5.2 %	500.3995e+3	76	3.0299980 ms
status	✓	✓	✓	✓

Measure	CN2CNQ...
value	5.2520020 ms
mean	3.6011406 ms
min	-3.490091 ms
max	10.413908 ms
sdev	3.1499580 ms
num	1.089e+3
status	✓
histo	

Quickly make CAN timing measurements and monitor system performance with the CANbus TDM parameters. LeCroy's statistical measurements with histograms, tracks and trends let you see how the bus behaves over time.

Data Extraction and Graphing

Extract data from the CAN message stream and use the track functions to graphically plot that data on the oscilloscope display. The digital data is used to create an analog waveform that can then be compared to other electrical signals.



Here, information on the steering angle and steering angle rate of change is extracted from the CAN message acquisition, rescaled to decimal values, and plotted as a time-correlated "Track" on the VBA display.

Convenient Table Display Summarizes Results

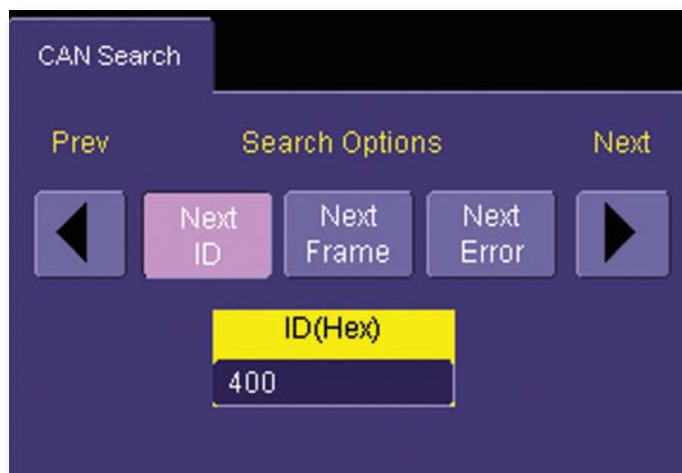
Turn your oscilloscope into a protocol analyzer with the Table display of decoded information. Custom configure the Table to display only the information you want and export Table data to an Excel file. Touch a message in the table and automatically zoom for detail.

Idx	Time	ID	DLC	Data	CRC	ACK	Bit Rate	Msg I
1	-30.1396 ms	0x0400	2	6a 6b		0x3cc7	0	500.393e+3
2	-29.1576 ms	0x0200	1	af		0x0419	0	499.972e+3
3	-29.0396 ms	0x0210	1	00		0x0983	0	499.962e+3
4	-20.5376 ms	0x0410	8	70 71 72 73 74 75 76 77		0x5e95	0	499.986e+3
5	-20.1156 ms	0x0400	2	6a 6b		0x3cc7	0	499.960e+3
6	-19.0976 ms	0x0200	1	9e		0x3739	0	500.016e+3
7	-19.9716 ms	0x0210	1	00		0x0983	0	500.010e+3
8	-15.5635 ms	0x18ccdd11	2	80 81		0x1c6e	0	500.468e+3
9	-14.0216 ms	0x18aabb01	2	55 aa		0x036a	0	499.989e+3

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

ID or Data values can be quickly located by searching for a specific value. In a long acquisition, pressing NEXT advances the single byte to the byte 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.

More Tools for Your Embedded System Test

LeCroy offers the same powerful triggering and intuitive decoding capabilities for LIN, FlexRay, I²C, SPI, and UART signals. For complete embedded system testing the MS Series mixed signal oscilloscopes add 18 or 36 digital channels to the oscilloscope allowing you to look at all your analog, digital, and serial data waveforms simultaneously with complete analog/digital cross pattern triggering.



LeCroy's MS Series high-performance mixed signal option provides a maximum input frequency of up to 500 MHz and up to 50 Mpts of memory per channel.

Specifications and Ordering Information

Specifications

Definition	CANbus TD	CANbus TDM
Protocol Setup	Select bit rate (10, 25, 33.333, 50, 83.333, 100, 125, 250, 500, 1000 kb/s or user-defined between 10-1000 kb/s)	
Decode Capability		
Format	Hexadecimal	
Decode Setup	Threshold definition required. Default is to Percent amplitude. Select bit rate.	
Decode Input	Any analog Channel, Memory or Math trace	
# of Decoded Waveforms	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. (Note: Use multi-grid if there is more than one decoder ON)	
Visual Aid	Color Coding for Frame, ID, DLC, DATA, CRC, Ack, Stuff Bits and Errors Decode information is intelligently annotated based on timebase setting	
Trigger Capability		
Format	Hexadecimal or Binary	
Trigger Setup	Trigger on All Frames, Frame ID, ID with Data, Remote Frames or Error Frames	
Address (ID) Condition Setup	Specify one Frame ID or a range of Frame IDs. Frame ID trigger can be combined with Data	
Conditional Trigger Setup	Conditional Frame ID and Conditional Data triggering available. Choose from <=, <, =, >, >=, <>, in range, out of range or don't care conditions	
Data Setup	Hexadecimal: # Data Bytes = 0 to 8. Data can be defined by nibble. Triggers on that data pattern regardless of position Binary: Any combination of 0,1, or X for 1-64 bits. Triggers on that data pattern regardless of position.	
Bit Rates	10, 25, 33.333, 50, 83.333, 100, 125, 250, 500, 1000 kb/s or user-defined between 10-1000 kb/s	
Trigger Input	Any analog Channel or the EXT input	
Trigger Design	Internal to oscilloscope, settable like any other oscilloscope trigger	
Search Capability		
Search Options	Search for Any Frame, Any Error or Frame ID in Hexadecimal format	
Measure/Graph Capability		
CAN Timing Measurements	NA	CAN-CAN, CAN-Analog, Time@CAN, CAN Message bit rate
CAN Data Extraction	NA	CAN-Value
CAN Bus Load Measurements	NA	CAN Bus Load %
Graphing Functions	NA	Track, Trend and Histogram of CAN measurements

Ordering Information

Product Description

Product Code

CANbus TDM

CAN Trigger, Decode and Measure/Graph Option for WavePro Zi	WPZi-CANbus TDM
CAN Trigger, Decode and Measure/Graph Option for WaveRunner Xi	WRXi-CANbus TDM
CANbus TDM Trigger, Decode, and Measure/Graph Option	CANbus TDM

CANbus TD

CAN Trigger, Decode Option for WavePro Zi	WPZi-CANbus TD
CAN Trigger, Decode Option for WaveRunner Xi	WRXi-CANbus TD
CAN Trigger, Decode Option for WaveSurfer Xs	WSXs-CANbus TD
CANbus TD Trigger and Decode Option	CANbus TD

Product Description

Product Code

Related Probes and Accessories

500 MHz Active Differential Probe (x10, $\div 1$, $\div 10$ or $\div 100$)	AP033
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

LeCroy scopes 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. This warranty includes:

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

Compatibility

WPZi-CANbus TDM and WRXi-CANbus TDM are compatible with the WavePro® Zi and WaveRunner® Xi oscilloscopes. WPZi-CANbus TD, WRXi-CANbus TD and WSXs-CANbus TD are compatible with WavePro Zi, WaveRunner Xi and WaveSurfer® Xs oscilloscopes. The minimum required software version is 5.7.2.1.

WaveRunner Xi oscilloscopes with serial numbers LCRY0608 or greater and WaveSurfer Xs oscilloscopes with serial numbers LCRY0304 or greater are required. Oscilloscopes with lower serial numbers can be upgraded.

CANbus TDM and CANbus TD are compatible with all other LeCroy X-Stream oscilloscopes and work with an external trigger module not shown in this datasheet.



1-800-5-LeCroy
www.lecroy.com

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