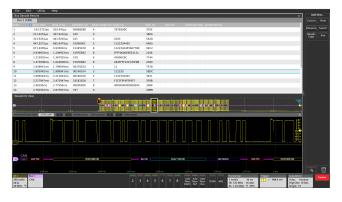
Tektronix[®]

Serial Triggering and Analysis

3 Series MDO, 4/5/6 Series MSO Applications Datasheet



On a serial bus, a single signal often includes address, control, data, and clock information. This can make isolating events of interest difficult. Optional serial applications transform the oscilloscope into a robust tool for debugging serial buses with automatic decode and analysis for I²C, SPI, eSPI, CAN, CAN FD, CAN XL, LIN, FlexRay, 10BASE-T1S, 100BASE-T1, SENT, RS-232/422/485, UART, USB 2.0, USB 3.0, USB 3.1 Gen 1, USB 3.2 Gen 1, Ethernet, I3C, SPMI, Spacewire, 8b10b, NFC, NRZ, MIL-STD-1553, ARINC 429, I²S, LJ, RJ, PCIe Gen 1/Gen 2/Gen 3, PSI5, CPHY, CXPI, DPHY, SMBus, 1-WIRE, EtherCAT, and TDM.

Key features

- Automated Serial Decode and Analysis Options for I²C, SPI, eSPI, I3C ¹, CAN, CAN FD, CAN XL, LIN, FlexRay, SENT¹, RS-232/422/485, UART, USB 2.0, USB 3.0, USB 3.1 Gen 1, USB 3.2 Gen 1, Ethernet¹, SPMI¹, MIL-STD-1553, ARINC 429, I²S, LJ, RJ, PSI5, PCIe Gen 1/Gen 2/Gen 3, DPHY, CXPI, CPHY, SMBus, 1-WIRE, EtherCAT, and TDM
- Trigger on all the critical elements of a serial bus such as address, data, etc.
- Decode all the critical elements of each message. No more counting 1s and 0s
- Search through long acquisitions with user-defined criteria to find specific messages
- Event Table shows decoded serial bus activity in a tabular, time-stamped format for quick summary of system activity

Serial Triggering and Analysis Applications

The serial applications support automatic trigger and decode for I²C, SPI, CAN, CAN FD, CAN XL, LIN, FlexRay, 10BASE-T1S, 100BASE-T1, SENT, RS-232/422/485, UART, USB 2.0, USB 3.0, USB 3.1 Gen 1, USB 3.2 Gen 1, Ethernet, I3C, SPMI, Spacewire, 8b10b, NRZ, MIL-STD-1553, ARINC 429, I²S, LJ, RJ, PCIe Gen 1/Gen 2/Gen 3, PSI5, SMBus, EtherCAT, and TDM buses, making it easier to locate, analyze, and debug events of interest.

Serial triggering

Trigger on packet content such as start of packet, specific addresses, specific data content, unique identifiers, etc. on popular serial interfaces such as I²C, SPI, CAN, CAN FD, CAN XL, LIN, FlexRay, SENT, RS-232/422/485, UART, USB 2.0, USB 3.0, USB 3.1 Gen 1, USB 3.2 Gen 1, Ethernet, I3C, SPMI, MIL-STD-1553, ARINC 429, I²S, LJ, RJ, PCIe Gen 1/Gen 2/Gen 3, PSI5, and TDM.

Bus display

The bus display provides a higher-level, combined view of the individual signals (clock, data, chip enable, and so on) that make up your bus, making it easy to identify where packets begin and end and identifying sub-packet components such as address, data, errors, and so on.

Bus decoding

Tired of having to visually inspect the waveform to count clocks, determine if each bit is a 1 or a 0, combine bits into bytes, and determine the hex value?

Let the oscilloscope with a serial application do it for you! Once you've set up a bus, the oscilloscope decodes each packet on the bus, and displays the value in hex, binary, ASCII, or decimal (certain buses only) in the bus waveform.

Results table

In addition to seeing decoded packet data on the bus waveform itself, you can view all captured packets in a tabular view much like you would see in a software listing. Packets are time stamped and listed consecutively with columns for each component (Address, Data, and so on).

Wave Inspector[®] search

Serial triggering is very useful for isolating the event of interest, but once you've captured it and need to analyze the surrounding data, what do you do?

In the past, users had to manually scroll through the waveform counting and converting bits and looking for what caused the event. With a serial application, you can enable the oscilloscope to automatically search through the acquired data for user-defined criteria including serial packet content. Each occurrence is highlighted by a search mark. Rapid navigation between marks is as simple as pressing the \leftarrow and \rightarrow arrow buttons on the oscilloscope front panel or the Search badge. The 3 Series MDO uses the arrows in the Search badge to navigate.

¹ Not available for 3 Series MDO.

I²C characteristics

Bus setup options

Characteristic	Description
I ² C Sources	Analog channels
(Clock and Data)	Digital channels
	Active Math channels ¹
	Active Reference channels ¹
Thresholds	Per-channel thresholds
Recommended Probing	Single-ended
Include R/W in Address	Yes or No
Address/Data Formats Available	Hex Binary

Bus decode

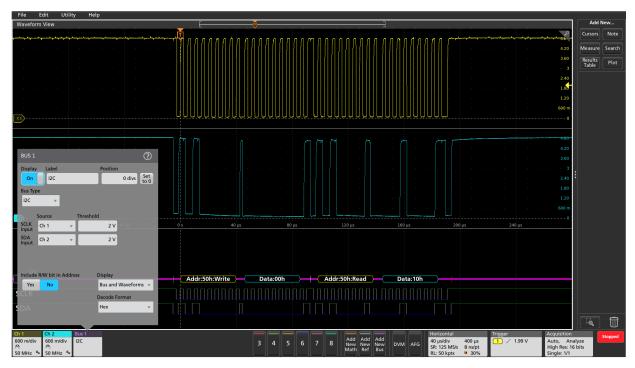
Characteristic	Description
Maximum Clock/Data Rate	Up to 10 Mb/s (automatic selection)
Decode Display	Start (green bar)
	Address (yellow packet)
	Data (cyan packet)
	Missing Ack (! symbol in red box)
	Stop (red bar)

Display modes

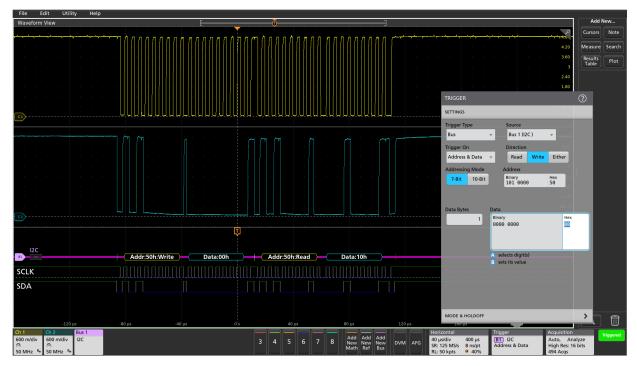
Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Results Table	Decoded packet data in a tabular view

Bus trigger and search options

Characteristic	Description
Trigger and/or Search On	Start
	Repeated Start
	Stop
	Missing Ack
	Address (7 or 10 bit)
	Data (1-5 bytes)
	Address and Data



Color-coded I²C bus display, using hexadecimal display format.



Triggering on a specific address value on the l^2C bus.

SPI characteristics

Bus setup options

Characteristic	Description
SPI Sources	Analog channels
(Clock, Data, and Slave Select)	Digital channels
	Active Math channels ¹
	Active Reference channels ¹
Thresholds	Per-channel thresholds
Recommended Probing	Single-ended
Decode Configuration:	
Framing	Slave Select (3-wire SPI), Idle Time (2-wire SPI)
Clock	Rising or Falling Edge
Slave Select	Active High or Active Low
Data	Active High or Active Low
	4 - 32 bits
Word Size	Most Significant (MS) First, Least Significant (LS)
Bit Order	First
Formats Available	Hex
	Binary

Characteristic	Description
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Results Table	Decoded packet data in a tabular view

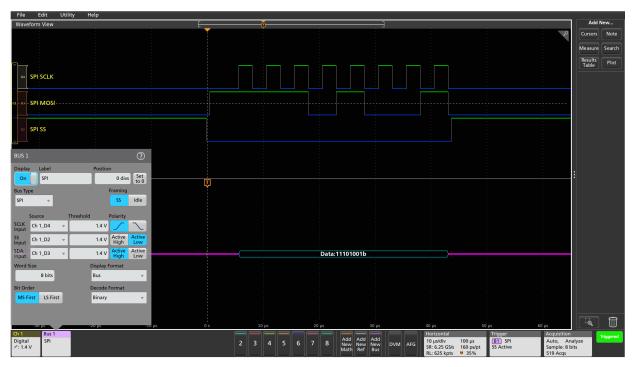
Bus trigger and search options

Characteristic	Description
Trigger and/or Search On	SS Active (3-wire SPI)
	Start of Frame (2-wire SPI)
	Data (1-16 bytes)

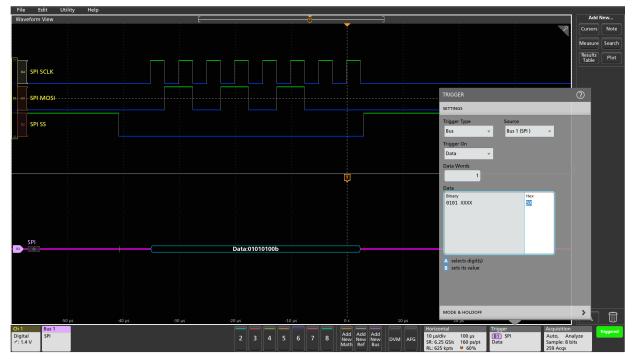
Bus decode

Characteristic	Description
Maximum Clock/Data Rate	Up to 10 Mb/s (automatic selection)
Decode Display	Start (green bar)
	Data (cyan packet)
	Stop (red bar)

Characteristic	Description
Bus	Bus only
Table continued	



SPI bus, captured with digital channels, showing binary display format of the color-coded SPI bus decoding.



Triggering on a specific data value on the SPI bus.

I3C characteristics¹

Bus setup options

Characteristic	Description
I3C Sources	Analog channels
(Clock and Data)	Digital channels
	Active Math channels
	Active Reference channels
Thresholds	Per-channel thresholds
Speed	High Speed (480 Mb/s)
	Full Speed (12 Mb/s)
	Low Speed (1.5 Mb/s)
Recommended Probing	Single-ended
Formats Available	Hex
	Binary
	Mixed Hex
Version	1.0
	1.1

Bus search options

Characteristic	Description
Search On	Start
	Repeated Start
	Address
	Data
	I3C SDR Direct Message
	I3C SDR Broadcast Message
	I3C DDR Message
	Errors
	Hot-Join
	Direct Message End
	Stop
	HDR Restart
	HDR Exit

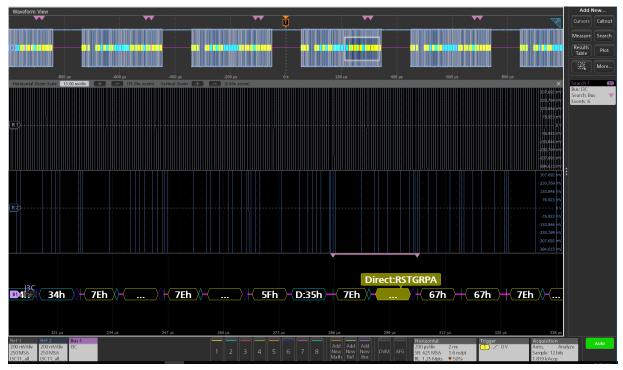
Bus decode

Characteristic	Description
Maximum Clock/Data Rate	Up to 12.5 Mb/s (automatic selection)
Decode Display	Start (green bar)
	Address (yellow packet)
	Commands (cyan packet)
	Data (cyan packet)
	Parity (purple packet)
	Stop (red bar)

Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Results Table	Decoded packet data in a tabular view

Bus Decode	Results									x	Add New
Bus 1 (I3C)										70 Packets Decoded	Cursors Callout
Index											
1	937.5ps	Direct:GETSTATUS						1		-	Measure Search
2	98.4375ns		23:Read		12 13			10		-	Results Plot
3	242.1875ns	Direct:SETDASA						1			
4	339.6875ns		7E:Write					1			More
5	438.4375ns	Direct:GETMXDS						0		-	
6	535.9375ns		23:Read		AC AC ACACAB			110		-	Search 1 🚯
7	804.6875ns	Broadcast:DEFSLVS			01 56			0011111111		-	Bus: IBC Search: Bus
8	1.309688µs	Direct:GETSTATUS						1			Events: 10
9	1.407188µs		23:Read		12 13			10			
10	1.550938µs	Direct:SETDASA						1		-	
11	1.648438µs		7E:Write					1		-	
12	1.747187µs	Direct:GETMXDS						0		-	
13	1.844688µs		23:Read		AC AC ACACAB		-	110		-	
14	2.113437µs	Broadcast:DEFSLVS			01 56			0011111111			
BUS 1				?				1			
On Bus Type 13C SCLK Input SDA Input Re	f1 v	Bus		m) 1'ertical Zoom 📕	200 rs 200 rs (1.40x z (1.40x z) (1.40x	ALVÍDA ÁRAN			800 ns		
100 HS Ref 1 500 mV/div 1.6 GS/s i3c_Clock,	Ref 2	Bus 1 I3C		200 ns			Eh 400 ns 5 6	7 8 Add New	Add Add New Bus	600 ns 700 ns 800 ns Horizontal Trigger Acquisition	nalyze Preview

I3C bus setup and MixedHex display, showing decode with version 1.1.



Searching the I3C bus with decode version 1.1 for the packet with Reset Group Address.



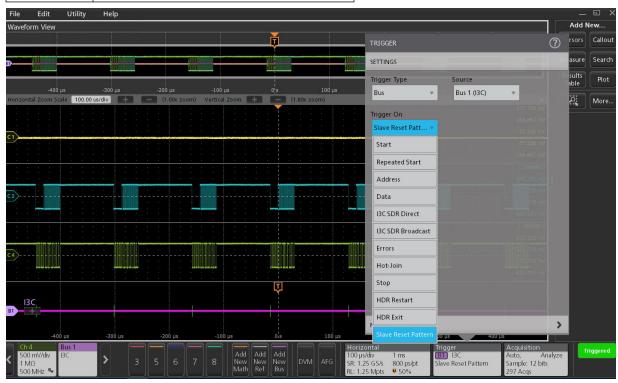
The Protocol Decode Results Table provides a time-stamped, tabular view of all captured packets on the I3C bus.



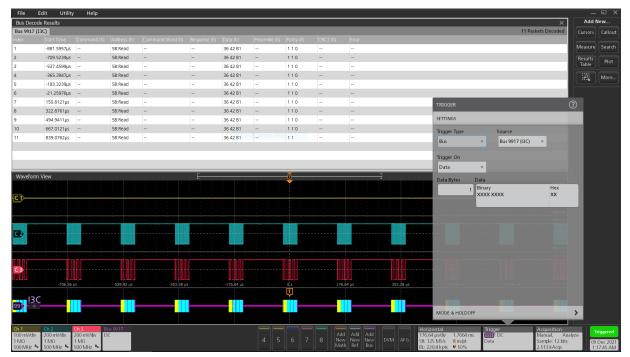
Searching on a specific data pattern on the I3C bus and automatically searching on Sync.

I3C (Trigger) characteristics

Characteristic	Description			
I3C Sources	 Select the I3C bus on which to trigger. Trigger On Select the type of information on which to trigger. 			
Trigger On	 Start Repeated Start Address Data I3C SDR Direct I3C SDR Broadcast Hot join Errors HDR Exit HRD Restart Stop Slave Reset Pattern 			



I3C 1.1 version Slave Reset pattern trigger.



Triggering on a specific 7-Bit read address value on the I3C bus.

RS-232, RS-422, RS-485, UART characteristics

Bus setup options

Characteristic	Description
Sources, RS-232, UART	Analog channels
	Digital channels
	Active Math channels ¹
	Active Reference channels ¹
Sources, RS-422,	Analog channels
RS-485	Active Math channels ¹
	Active Reference channels ¹
Polarity	Normal (RS-232)
	Inverted (UART, RS-422, RS-485)
Parity	None
	Odd
	Even
Recommended Probing, RS-232, UART	Single-ended
Recommended Probing, RS-422, RS-485	Differential
Number of Bits	7 - 9
Formats Available	Hex
	Binary
	ASCII
	Packet View
Data Inputs	One, Two
Bit Order	MSB, LSB

-	ay	m	odes

Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Table continued	

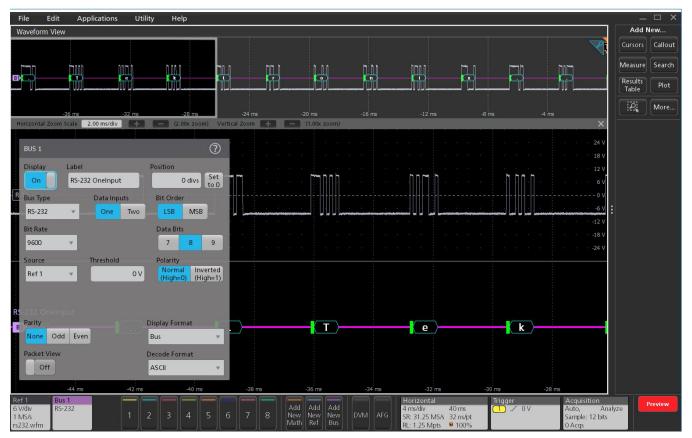
Т

Characteristic	Description
Results Table	Decoded packet data in a tabular view

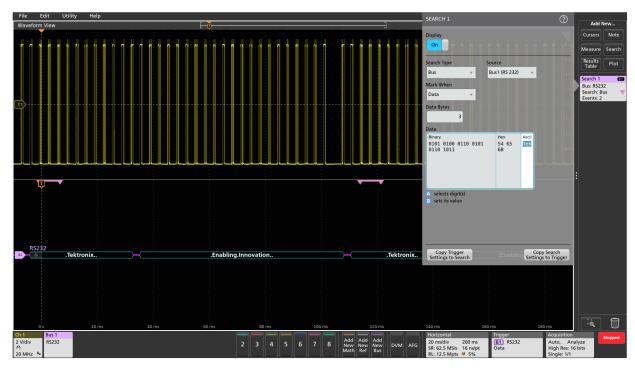
Bus trigger and search options

Characteristic	Description
Trigger and/or Search On	Start
	End of Packet
	Data (1 - 10 bytes)
	Parity Error

Characteristic	Description
Maximum Clock/Data	Up to 15 Mb/s
Rate	For 3 Series MDO: Up to 10 Mb/s
Bit Rate Selection	300 b/s
	1,200 b/s
	2,400 b/s
	9,600 b/s
	19,200 b/s
	38,400 b/s
	115,200 b/s
	921,600 b/s
	Custom (All but 3 Series MDO: 50 b/s - 15 Mb/s
	Custom (for 3 Series MDO): 50 b/s - 10 Mb/s
Decode Display	Start (green packet)
	Data (cyan packet)
	Parity (purple packet)
	Parity Error (red packet)



RS-232 bus setup and ASCII display, showing assignment of source signal, digital threshold, and polarity.



RS-232 bus shown in Packet View format, with the Wave Inspector search automatically searching for the data string "Tek".

CAN characteristics (Version 2.0)

Bus setup options

Characteristic	Description	
Source for CAN_H, CAN_L, Rx, or Tx	Analog channels	
(single-ended probing)	Digital channels	
	Active Math channels ¹	
	Active Reference channels ¹	
Source for Diff	Analog channels	
(differential probing)	Active Math channels ¹	
	Active Reference channels ¹	
Thresholds	Per-channel thresholds	
Recommended Probing: CAN_H, CAN_L, Rx, Tx Diff	Single-ended Differential	
Bit Rate Selection: Predefined list of rates	10 kb/s - 1 Mb/s	
Custom	All but 3 Series MDO: 1 kb/s - 1 Mb/s	
	3 Series MDO: 10 kb/s - 1 Mb/s	
Table continued		

Characteristic	Description
Sample Point	All but 3 Series MDO: 0% - 100% of bit period of unit interval
	3 Series MDO: 5% - 95% of bit period of unit interval
Formats Available	Mixed Hex
	Hex
	Binary
	Symbolic (.dbc) ¹

Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Results Table	Decoded packet data in a tabular view

Bus trigger and search options

Characteristic	Description
Trigger and/or Search	Start of Frame
On	Type of Frame (Data, Remote, Error, Overload)
	Identifier (Standard or Extended)
	Data (number of bytes 1-8, trigger or search when =, \neq , <, <, >, ≥)
	Identifier and Data
	EOF
	Missing Ack
	Bit Stuff Error

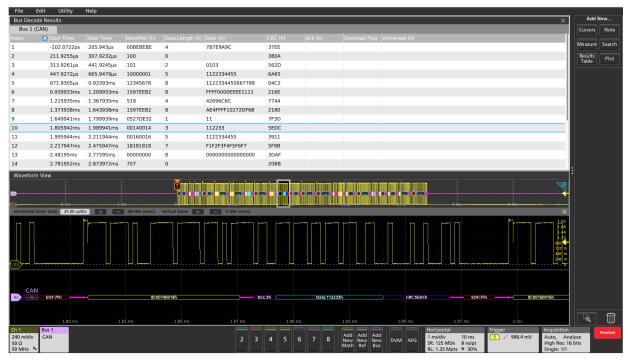
Symbolic bus search options

Characteristic	Description
Message	As defined by the .dbc file ¹
Table continued	

Characteristic	Description
Message and Signal	As defined by the .dbc file ¹

Bus decode

Characteristic	Description
Maximum Clock/Data Rate	Up to 1 Mb/s (automatic selection)
Decode Display	Start of Frame (green bar)
	Identifier (yellow packet)
	Data Length Control (purple packet)
	Data (cyan packet)
	CRC (purple packet)
	End of Frame (red bar)
	Errors (red packet)



Protocol Decode Results Table provides a time-stamped, tabular view of all captured packets on the CAN bus.



Triggering on a specific extended Identifier value on the CAN bus.

CAN XL characteristics

Bus setup options

Characteristic	Description
Source for CAN_H, CAN_L, Rx, or Tx	Analog channels
(Single-ended probing)	Digital channels
	Active Math channels
	Active Reference channels
Source for Diff	Analog channels
(Differential probing)	Active Math channels
	Active Reference channels
Thresholds	Per-channel thresholds
Recommended Probing:	
CAN_H, CAN_L, Rx, Tx	Single-ended
Diff	Differential
Nominal Bit Rate Selection:	
Predefined list of rates	10 kb/s - 1 Mb/s
Custom	50 kb/s - 1 Mb/s
XL Bit Rate Selection:	
Predefined list of rates	1 Mb/s - 20 Mb/s
Table continued	

Characteristic	Description
Custom	500 kb/s - 20 Mb/s
Sample Point	55% - 95% of bit period of unit interval
Formats Available	Mixed Hex
	Hex
	Binary

Bus trigger and search options

Characteristic	Description
Trigger On	Start of Frame
	End of Error
Table continued	

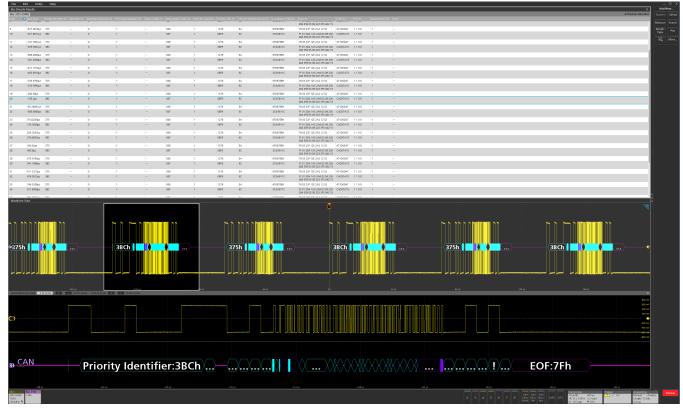
Characteristic	Description
Search On	Start of Frame
	Type of Frame (XL Data Frame)
	Priority Identifier
	Data (1 byte)
	XL Bits (Acceptance Field, Virtual CAN Network ID, SDU Type, Simple Extended Content, Stuff Bit Count, Arbitration to Data Sequence, Data to Arbitration Sequence)
	ADS Type (Arbitration to Data High Bit, Data High Bit 1, Data High Bit 2, Data Low Bit)
	DAS Type (DAH, Active High 1, Active High 2, Active Low 1)
	End of Frame
	Error (Missing Ack, XL Form Error, CRC, Any Error)
	CRC Type (PCRC, FCRC)

Bus decode

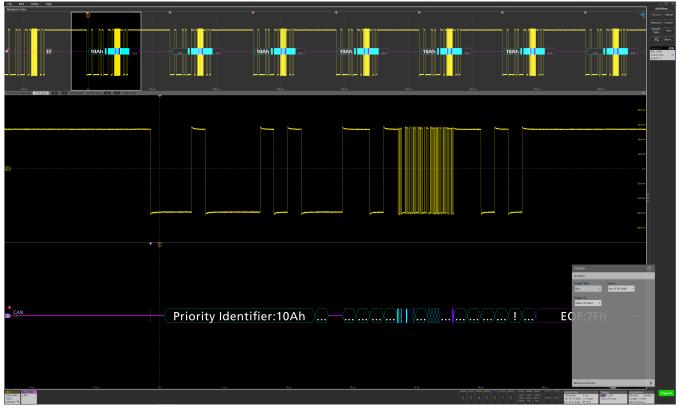
Characteristic	Description
Decode Display	Start of Frame (green bar)
	Priority Identifier (cyan packet)
	Remote Request Substitute (cyan packet)
	FD Format Indicator (cyan packet)
	XL Format Indicator (cyan packet)
	Reserved Bit XL Format (cyan packet)
	XL Bits (cyan packet)
	Data Length Control (purple packet)

Table continued...

Characteristic	Description
	PCRC (purple packet)
	Data (cyan packet)
	FCRC (purple packet)
	FCP (purple packet)
	Ack (cyan packet)
	Ack Delimiter (cyan packet)
	End of Frame (Dark pink packet)
	Errors (red packet)
Search On	Start of Frame
	Type of Frame (XL Data Frame)
	Priority Identifier
	Data (1 byte)
	XL Bits (Acceptance Field, Virtual CAN Network ID, SDU Type, Simple Extended Content, Stuff Bit Count, Arbitration to Data Sequence, Data to Arbitration Sequence)
	ADS Type (Arbitration to Data High Bit, Data High Bit 1, Data High Bit 2, Data Low Bit)
	DAS Type (DAH, Active High 1, Active High 2, Active Low 1)
	End of Frame
	Error (Missing Ack, XL Form Error, CRC, Any Error)
	CRC Type (PCRC, FCRC)



Protocol Decode Results Table provides a time-stamped, tabular view of all captured packets on the CAN XL bus.



Triggering on Start of Frame on the CAN XL bus and searching on it.

CAN FD (ISO and non-ISO) characteristics

Bus setup options

Characteristic	Description
Source for CAN_H,	Analog channels
CAN_L, Rx, or Tx (single-ended probing)	Digital channels
	Active Math channels ¹
	Active Reference channels ¹
Source for Diff	Analog channels
(differential probing)	Active Math channels ¹
	Active Reference channels ¹
Thresholds	Per-channel thresholds
Recommended Probing:	Single -ended
CAN_H, CAN_L, Rx, or Tx	Differential
Diff	
Version	ISO
	non-ISO
SD Bit Rate Selection:	10 kb/s - 1 Mb/s
Predefined list of rates	All but 3 Series MDO: 50 kb/s - 10 Mb/s
Custom	3 Series MDO: 10 kb/s - 1 Mb/s
FD Bit Rate Selection:	All but 3 Series MDO: 1 Mb/s - 16 Mb/s
Predefined list of rates	3 Series MDO: 1 Mb/s - 7 Mb/s
Custom	All but 3 Series MDO: 500 kb/s - 16 Mb/s
	3 Series MDO: 500 kb/s - 7 Mb/s
Sample Point	All but 3 Series MDO: 55% - 95% of bit period of unit interval
	3 Series MDO: 15% - 95% of bit period of unit interval
Formats Available	Mixed Hex
	Hex
	Binary
	Symbolic (.dbc) ¹

Display modes

Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Results Table	Decoded packet data in a tabular view

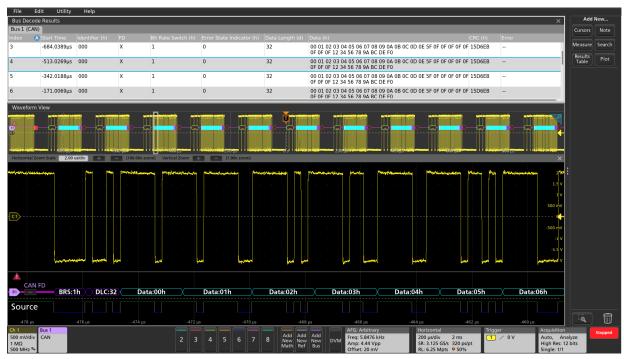
Bus trigger and search options

Characteristic	Description
Trigger and/or Search	Start of Frame
On	Type of Frame (Data, Remote, Error, Overload)
	FD Bits (Bit Rate Switch bit, Error State Indicator bit)
	Identifier (Standard or Extended)
	Data (1-8 bytes, trigger or search when =, \neq , <, ≤, >, ≥)
	Identifier and Data
	End of Frame
	Error (Missing Ack, Bit Stuffing Error, FD Form Error, Any Error)

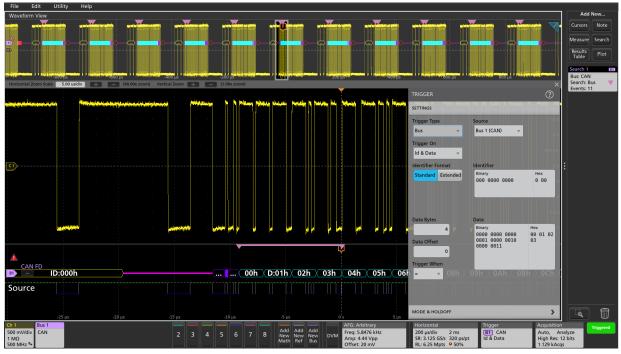
Symbolic bus search options

Characteristic	Description
Message	As defined by the .dbc file ¹
Message and Signal	As defined by the .dbc file ¹

Characteristic	Description
Decode Display	Start of Frame (green bar)
	Identifier (yellow packet)
	Data Length Control (purple packet)
	Data (cyan packet)
	CRC (purple packet)
	End of Frame (red bar)
	Errors (red packet)



Protocol Decode Results Table provides a time-stamped, tabular view of all captured packets on the CAN FD bus.



Triggering on a specific Identifier value and data pattern on the CAN FD bus and automatically searching on the same data pattern.

LIN characteristics (Version 2.0)

Bus setup options

Characteristic	Description
LIN Source	Analog channels
	Digital channels
	Active Math channels ¹
	Active Reference channels ¹
Thresholds	Per-channel thresholds
Recommended Probing	Single-ended
Polarity	Normal
	Inverted
Bit Rate Selection:	1.2 kb/s - 19.2 kb/s
Predefined list of rates	All but 3 Series MDO: 1 kb/s - 100 kb/s
Custom	3 Series MDO: 800 b/s - 100 kb/s
Sample Point	All but 3 Series MDO: 0% - 100% of bit period of unit interval 3 Series MDO: 10% - 90% of bit period of unit interval
LIN Standard	V 1.x V 2.x Both
Include Parity Bits with ID	Yes No
Formats Available	Hex Binary
	Mixed

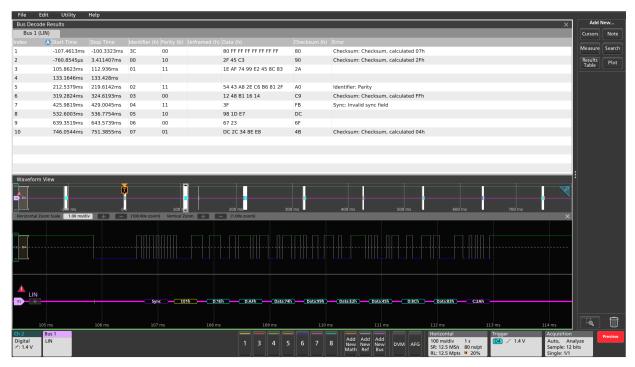
Display modes

Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Results Table	Decoded packet data in a tabular view

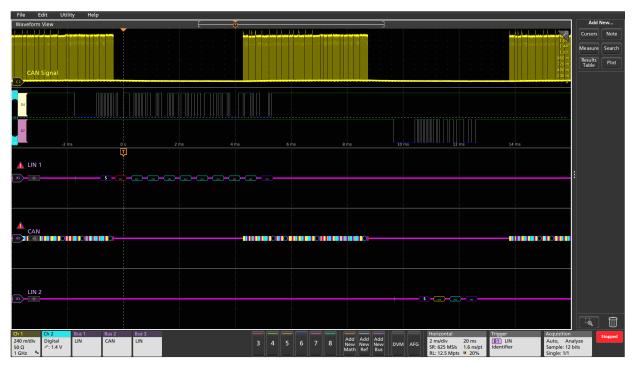
Bus trigger and search options

Characteristic	Description
Trigger and/or Search On	Sync
	Identifier
	Data (number of bytes 1-8, trigger or search when =, \neq , <, <, >, >, Inside Range, Outside Range)
	ID and Data
	Wakeup Frame
	Sleep Frame
	Error (Sync, ID Parity, Checksum)

Characteristic	Description
Maximum Clock/Data Rate	Up to 100 kb/s, by LIN definition up to 20 kb/s (for automated decoding of bus)
Decode Display	Start of Frame (green bar)
	Sync
	Identifier (yellow packet)
	Data (cyan packet)
	CRC (purple packet)
	Errors (red packet)



Protocol Decode Results Table provides a time-stamped, tabular view of all captured LIN packets.



Display of multiple LIN and CAN buses, showing timing between the buses.

FlexRay characteristics (Version 2.0)

Bus setup options

Characteristic	Description
Source for Differential Probing (Bdiff)	Analog channels
	Active Math channels ¹
	Active Reference channels ¹
Source for Single-ended Probing (BP, BM)	Analog channels
	Digital channels
	Active Math channels ¹
	Active Reference channels ¹
Source for Single-ended Probing (Tx,	Analog channels
Rx)	Digital channels
	Active Math channels ¹
	Active Reference channels ¹
Thresholds:	High and Low thresholds
Bdiff	High and Low thresholds
BP, BM (analog channels)	Single threshold
BP, BM (digital channels)	Single threshold
Tx, Rx	
Recommended Probing:	Differential
Bdiff, BP, BM	Single-ended
Tx, Rx	
Channel Type	A
	В
Bit Rate Selection:	2.5 Mb/s, 5 Mb/s, 10 Mb/s
Predefined list of rates	1 Mb/s - 10 Mb/s
Custom	
Formats Available	Hex
	Binary
	Mixed Hex (Decimal: ID, Len, and Count; Hex: Data and CRCs)

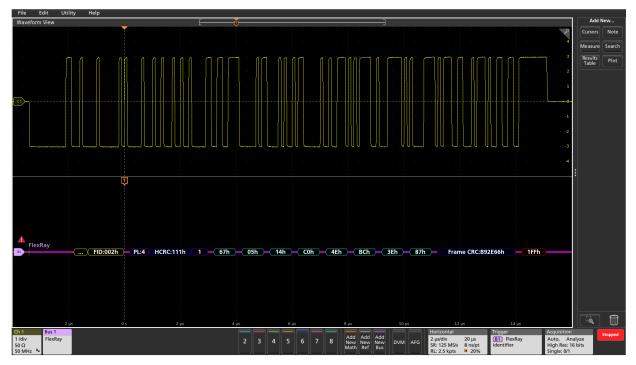
Display modes

Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Results Table	Decoded packet data in a tabular view

Bus trigger and search options

Characteristic	Description
Trigger and/or Search	Start of Frame
On	Indicator Bits (Normal, Payload, Null, Sync, Startup)
	Cycle Count (when =, \neq , <, ≤, >, ≥)
	Header Fields (Indicator Bits, Identifier, Payload Length, Header CRC, and Cycle Count)
	Identifier (when =, \neq , <, ≤, >, ≥)
	Data (when =, ≠, <, >, ≤, ≥)
	Identifier and Data
	End Of Frame (Static, Dynamic)
	Error (Header CRC, Trailer CRC, NULL Frame in Static, NULL Frame in Dynamic, Sync Frame in Dynamic, Start Frame No Sync)

Characteristic	Description
Maximum Clock/Data Rate	Up to 10 Mb/s (for automated decoding of bus)
Decode Display	TTS (purple box)
	Start (green bracket)
	Frame ID (yellow box)
	Payload Length (purple box)
	Headers (purple box)
	Cycle Count (yellow box)
	Data (cyan box)
	CRC, DTS, CID (purple box)
	Stop (red bracket)



Decoded FlexRay bus, with the acquisition triggered on a specified identifier value.



Decoded FlexRay bus, with all data values in a specific range marked with pink brackets.

SENT Characteristics¹

Bus setup options

Characteristic	Description
SENT source	Analog channels
	Digital channels
	Active Math channels
	Active Reference channels
Thresholds	Per-channel thresholds
Recommended Probing	Single-ended
Polarity	Normal
	Inverted
Clock Tick	1 µs - 300 µs
Tick Tolerance	1% - 30%
Fast Data Channels	1 or 2
Data Nibbles	3, 4, or 6 nibbles
(1 Fast Data Channel)	
Channel Widths (C1/C2)	12/12, 14/10, or 16/8 bits
(2 Fast Data Channels)	
Pause Pulse	Yes
	No
Slow Channel	None
	Enhanced w/ 4-bit ID
	Enhanced w/ 8-bit ID
	Short
Formats Available	Mixed Hex
	Binary
	Hex
	Mixed Decimal

Display modes

Characteristic	Description
Bus	Bus only
Table continued	

Characteristic	Description
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Results Table	Decoded packet data in a tabular view

Bus trigger options

Characteristic	Description
Trigger On	Start of Packet
	Fast Channel(s) (Status/Communication, Data)
	Slow Channel (Message ID, Data)
	CRC Error (Fast channel, Slow channel)

Bus search options

Characteristic	Description
Search On	Start of Packet
	Fast Channel(s) (Status/Communication, Data)
	Slow Channel (Message ID, Data)
	Pause Pulse (Number of Ticks)
	Error (Frame Length, Fast channel CRC, Slow channel CRC)

Characteristic	Description
Maximum Clock/Data Rate	Up to 10 Mb/s (for automated decoding of bus)
Decode Display	Sync (green packet)
	Fast Channel Status (purple packet)
	Slow Channel Message ID (yellow packet)
	Data (cyan packet)
	CRC (purple packet)
	Pause (purple packet)
	Errors (red packet)

File E	dit Utility	Help								
Bus Decod	e Results							×	Waveform View	Add New
Bus 1 (SEN	T)									Cursors Note
Index 🛛 🗛	Start Time	Status	Chan 1 (h)	Chan 2 (h)	CRC (h)		S Data (h)			
44	-13.23838ms	01 00	B5E	4F5	В					Measure Search
45	-12.38638ms	01 00	2B2	4C9	5					Results Plot
46	-11.53438ms	10 00	978	1A2	3				●77h ●D075h ● ◆ 07h ● D075h ● (● D075h ● (● D075h ● (+ ● D075h ● (+ ●	Table
47	-10.68238ms	11 00	0EC	7FE	2					
48	-9.830377ms	10 00	694	4B2	3				-40 [°] ms -30 [°] ms -20 [°] ms -10 [°] ms 0 [°] s 10 [°] ms 20 [°] ms 30 [°] ms 40 [°] ms	
49	-8.978379ms	01 00	B66	3BF	3	07	075	01	Horizontal Zoom Scale 2.50 ms/div 🕂 🦰 (4.00x zoom) Vertical Zoom 🕂 🦳 (1.00x zoom) 🗙	
50	-8.126378ms	10 00	95D	A54	С	Start			204V	
51	-7.274379ms	10 00	OBE	F4A	D				2.04 V	
52	-6.422379ms	10 00	E48	083	0					
53	-5.570378ms	10 00	41A	DCB	F				1 is the second state of the $136 V$	
54	-4.718377ms	10 00	5D8	FD7	F					
55	-3.866378ms	11 00	1F7	0E5	2					
56	-3.014378ms	00 00	3C1	3BC	0				🗳 teres a series de la companya de la compa	
57	-2.162378ms	00 00	F08	3D5	5				. The second sector is the first of the second	
58	-1.310377ms	00 00	A97	4A9	F					
59	-458.378µs	00 00	F06	DFB	6					
60	393.6206µs	00 00	27F	C72	С					
61	1.245621ms	01 00	532	FB3	A					
62	2.097622ms	01 00	B5E	4F5	В					
63	2.949623ms	01 00	2B2	4C9	5					
64	3.801621ms	10 00	978	1A2	3					
65	4.653623ms	11 00	0EC	7FE	2					
66	5.505623ms	10 00	694	4B2	3					
67	6.357621ms	01 00	B66	3BF	3	07	075	01		
68	7.209623ms	10 00	95D	A54	С	Start			SENT	
69	8.061621ms	10 00	OBE	F4A	D					
70	8.913622ms	10 00	E48	083	0				Data:075h 01h ID:07h Data:075h	
71	9.765623ms	10 00	41A	DCB	F					
72	10.61762ms	10 00	5D8	FD7	F					
73	11.46962ms	11 00	1F7	0E5	2			**		
74	12.32162ms	00 00	3C1	3BC	0					ia
									-17.5 ms -15 ms -12.5 ms -10 ms -7.5 ms -5 ms -2.5 ms 0 s 2.5 ms	
Ch 1 340 mV/div 1 MΩ 500 MHz ^B w	Bus 1 SENT				2 3	4 5	6 7	8 1	Add Add Add Add Add Adw AFG Arbitrary Horizontal Trigger Acquisition Awy New New Rew Bus DVM Freq: 10 Hz Anno.211 Vpp Offset: 783 mV RL: 1.25 MS/s 80 ns/pt Single: 1/1	

Protocol Decode Results Table provides a time-stamped, tabular view of all captured packets on the SENT bus.



Triggering on a specific Fast Channel Status and data pattern on the SENT bus and automatically searching on the same data pattern.

MIL-STD-1553 characteristics

Bus setup options

Characteristic	Description
MIL-STD-1553 Source	Analog channels
	Active Math channels
	Active Reference channels
Polarity	Normal
	Inverted
Thresholds	Single-ended: Per-channel thresholds
	Differential: High and low thresholds
Recommended Probing	Single-ended or differential
Bit Rate	1 Mb/s per the standard
Response Time	2 µs-100 µs
Formats Available	Mixed Hex
	Mixed ASCII
	Hex
	Binary

Display modes

Characteristic	Description
Bus	Bus only
Results Table	Decoded packet data in a tabular view

Bus trigger and search options

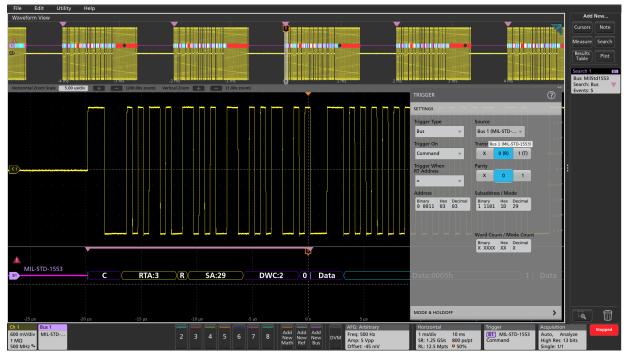
Characteristic	Description
Trigger and/or Search On	Sync Command (Transmit/Receive Bit, Parity, Subaddress / Mode, Word Count / Mode Count, and RT Address =, ≠, <, ≤, >, ≥, Inside Range, Outside Range) Status (Parity, Bit 9 - Message Error,

Characteristic	Description
	Bit 10 - Instrumentation,
	Bit 11 - Service Request,
	Bit 15 - Broadcast Command Received,
	Bit 16 - Busy,
	Bit 17 - Subsystem Flag,
	Bit 18 - Dynamic Bus Control Acceptance,
	Bit 19 - Terminal Flag,
	and Data =, ≠, <, ≤, >, ≥,
	Inside Range, Outside Range)
	Data (Parity, and Data =, \neq , <, ≤, >, ≥,
	Inside Range, Outside Range)
	Time (RT / IMG) (> Maximum, < Minimum, Inside range, Outside Range)
	Error (Parity Error, Sync Error, Manchester Error (trigger only), Non-contiguous Data)

Characteristic	Description
Maximum Clock/Data Rate	Up to 1Mb/s (for automated decoding of bus)
Decode Display	Start (green bar)
	Sync (purple packet with Word Type identified)
	Address (yellow packet)
	R/T (purple packet)
	Word Count (purple packet)
	Data (cyan packet)
	Parity (purple packet)
	Errors (red packet)
	Stop (red bar)



Protocol Decode Results Table provides a time-stamped, tabular view of all captured MIL-STD-1553 packets.



Triggering on a specific command pattern on the MIL-STD-1553 bus and automatically searching on the same pattern.

ARINC 429 characteristics (ARINC Specs 429 PART 1-17)

Bus setup options

Characteristic	Description
ARINC 429 Source	Analog channels
	Active Math channels
	Active Reference channels
Signal Type	Differential
Polarity	Normal
	Inverted
Thresholds	High and low thresholds
Recommended Probing	Differential
Bit Rate Selection:	12.5 kb/s, 100 kb/s
Predefined list of rates	10 kb/s - 1 Mb/s
Custom	
Data Format	Data (19 bits)
	SDI+Data (21 bits)
	SDI+Data+SSM (23 bits)
Formats Available	Mixed Hex
	Hex
	Binary

Bus trigger and search options

Characteristic	Description
Trigger and/or Search On	Word Start
	Label (when =, ≠, <, ≤, >, ≥, Inside Range, Outside Range)
	Data (when =, ≠, <, ≤, >, ≥, Inside Range, Outside Range)
	Label and Data (Label value and Data =, ≠, <, ≤, >, ≥, Inside Range, Outside Range)
	Word End
	Error (Any Error, Parity Error, Word Error, Gap Error)

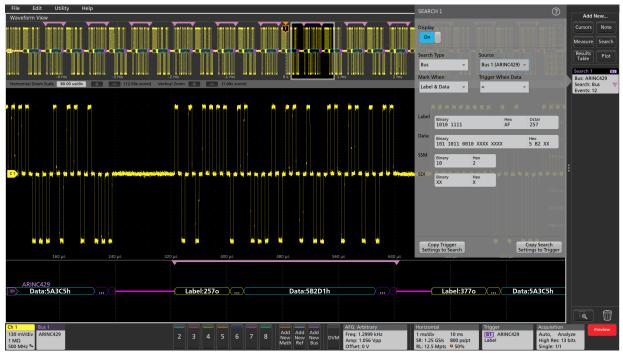
Bus decode

Characteristic	Description
Decode Display	Start (green bracket)
	Label (yellow box)
	Source Destination Identifier (yellow box)
	Data (cyan box)
	Sign/Status Matrix (purple box)
	Parity (purple box)
	Stop (red bracket)
	Error (red box)

Characteristic	Description
Bus	Bus only
Results Table	Decoded packet data in a tabular view



Decoded ARINC 429 bus, with the acquisition triggered on a specified label value.



Decoded ARINC 429 bus, with all data values in a specific range marked with pink brackets.

Audio characteristics

Bus setup options

Characteristic	Description
Audio Sources (Bit	Analog channels
Clock, Word Select, Data)	Digital channels
	Active Math channels ¹
	Active Reference channels ¹
Thresholds	Per-channel thresholds
Bit Clock Polarity	Rising Edge
	Falling Edge
Word Select Polarity	Normal
	Invert
Data Polarity	Active High
	Active Low
Word Size	4 - 32 bits
Formats Available	Hex
	Binary
	Signed Decimal

Characteristic	Description
Results Table	Decoded packet data in a tabular view

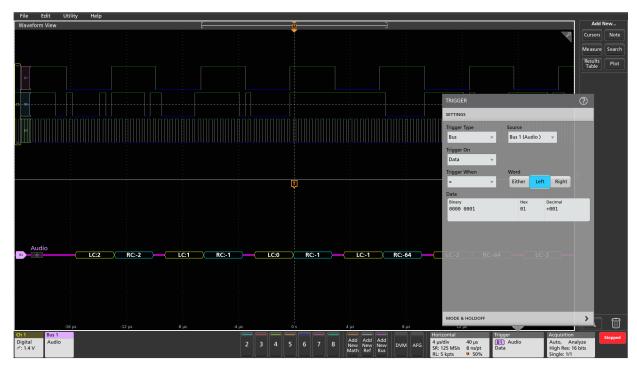
Bus trigger and search options

Characteristic	Description
	Word Select (I ² S, LJ, RJ only)
On	Frame Sync (TDM only)
	Data (when =, ≠, <, >, ≤, ≥, Inside Range, Outside Range; Left, Right, or Either Word)

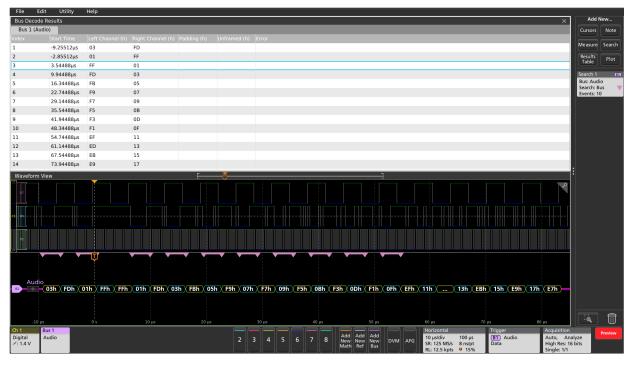
Bus decode

Characteristic	Description
Maximum Clock/Data Rate	All but 3 Series MDO: Up to 10 Mb/s (for automated decoding of bus)
	3 Series MDO: Up to 12.5 Mb/s (for automated decoding of I2S/LJ/RJ bus)
	3 Series MDO: Up to 25 Mb/s (for automated decoding of TDM bus)
Decode Display	Left Channel Data (I ² S, LJ, RJ) (yellow box)
	Right Channel Data (I ² S, LJ, RJ) (cyan box)
	Channel 1 Data (TDM) (yellow box)
	Channel 2 - N Data (TDM) (cyan box)

Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Table continued	



Decoded I²S bus, with data values displayed in signed decimal format, and the MSO triggered on a specific data value.



Decoded I²S bus, with data values displayed in hex and Results Table format, and the Wave Inspector automatic search marking all occurrences of the data values equal to 0X hex.

USB 2.0 Characteristics (Version 2.0)

Bus setup options

Characteristic	Description
USB 2.0 Source(s)	Analog channels
	Digital channels (single-ended)
	Active Math channels
	Active Reference channels
Thresholds	Per-channel thresholds
Speed	USB 1.0 (1.5 Mbps)
	USB 1.1 (12 Mbps)
	USB 2.0 (480 Mbps)
Recommended Probing:	
USB 1.0 and USB 1.1	Single-ended
USB 2.0	Differential
Formats Available for	Mixed Hex
USB 1.0, USB 1.1, and USB 2.0	Hex
	Binary
	Mixed ASCII

Display modes

Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Results Table	Decoded packet data in a tabular view

Bus trigger options

Description
Sync
Reset
Suspend
Resume
End of Packet
Token (address) Packet
Data Packet

Characteristic	Description
	Handshake Packet: ACK, NAK, STALL, NYET (USB 2.0 only)
	Special Packet: PRE (USB 1.1 only), ERR, SPLIT, PING, Reserved
	Error: PID check, CRC5 or CRC16, Bit stuffing (USB 1.0 and USB 1.1 only)

Bus Search options

Characteristic	Description
Search On	Sync
	Reset
	Suspend
	Resume
	End of Packet
	Token (address) Packet
	Data Packet
	Handshake Packet: ACK, NAK, STALL, NYET (USB 2.0 only)
	Special Packet: PRE (USB 1.1 only), ERR, SPLIT, PING, Reserved
	Error: PID check, CRC5 or CRC16, Bit stuffing (USB 1.0 and USB 1.1 only)

Characteristic	Description
Decode Display	Start of packet (green bar)
	Sync (green packet)
	PID (yellow packet)
	Token (address) (yellow packet)
	Data (cyan packet)
	CRC (purple packet)
	Error (red packet)
	End of packet (red bar)



Protocol Decode Results Table provides a time-stamped, tabular view of all captured packets on the USB bus.



Triggering on a specific data pattern on the USB 2.0 bus and automatically searching on Sync.

USB Characteristics (Version 3.0, 3.1 Gen 1, 3.2 Gen 1)

Bus setup options

Characteristic	Description
USB Source(s)	Analog channels
	Digital channels
	Active Math channels
	Active Reference channels
Thresholds	Per-channel thresholds
Speed	USB 1.0 (1.5 Mbps)
	USB 1.1 (12 Mbps)
	USB 2.0 (480 Mbps)
	USB 3.0 (5 Gbps)
	USB 3.1 Gen 1 (5 Gbps)
	USB 3.2 Gen 1 (5 Gbps)
Recommended Probing:	
USB 1.0, USB 1.1, USB 3.0, USB 3.1 Gen 1, and USB 3.2 Gen 1	Single-ended
USB 2.0, USB 3.0, USB 3.1 Gen 1, and USB 3.2 Gen 1	Differential
Formats Available:	
USB 1.0, USB 1.1, and USB 2.0	Hex
	Binary
	Mixed Hex
	Mixed ASCII
USB 3.0, USB 3.1 Gen 1, and USB	Hex
3.2 Gen 1	Binary

able continued

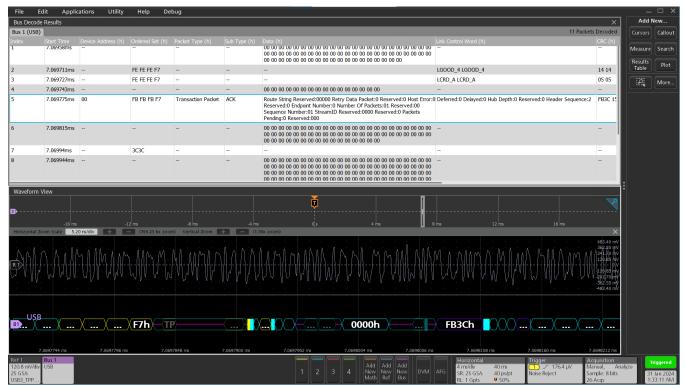
Characteristic	Description
Packet View for USB 3.0, USB 3.1 Gen 1, and USB 3.2 Gen 1	On
	Off

Display modes

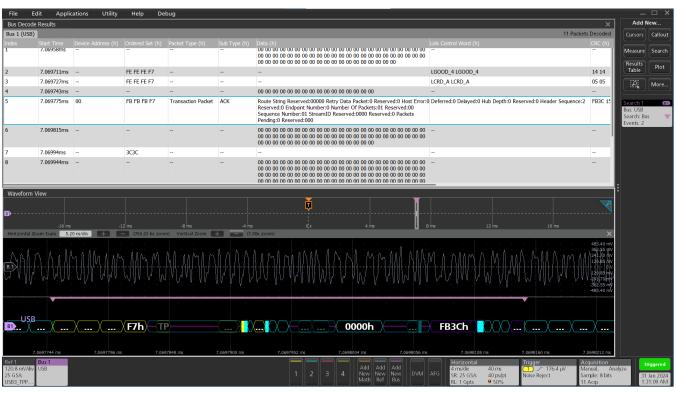
Characteristic	Description
Bus	Bus only
Results Table	Decoded packet data in a tabular view

Bus Search options

Characteristic	Description
Search On	Packet View On Only
	Ordered Set: TSEQ, TS1, TS2, SKP, DPPSTART, DPPEND, DPPABORT, LCSTART, HPSTART
	LMP: Port Capability, Port Configuration, Port Configuration Response, Precision Time Management, Set Link Function, U2 Inactivity Timeout, Vendor Device Test, ANY
	TP: ACK, DEV Notification, ERDY, NRDY, PING, PING Response, STATUS, STALL, ANY
	Packet Type: LMP, TP, DP, ITP, ANY
	Error: CRC5, CRC16, CRC32
	Packet View Off Only
	Ordered Set: TSEQ, TS1, TS2, SKP
	 Compliance Pattern: CP0, CP1, CP2, CP3, CP4, CP5/6, CP7/8
	Custom
	Error: Character, Disparity
	Control Character: COM, EDB, END, EPF, SDP, SHP, SKP, SLC, SUB, Any



USB3 bus setup and Mixed Hex display, showing decode with speed USB 3.0 and packet view On.



Searching the USB bus with decode speed USB 3.0 and packet view On for the TP packets.

Bus Decode	Results										×	Add I	New
Bus 1 (USB)										293	Packets Decoded	Cursors	Callout
Index													
1	-3.5274µs		FB FB FB F7				Link Management F	Packet	Port Configuration		1	Measure	Search
2	-3.487399µs											Results	Plot
3	-3.455401µs		FE FE FE F7									Table	
4	-3.439399µs								-				More
5	-3.407399µs		3C3C										
6	-3.401401µs		FB FB FB F7				Link Management F	Packet	Port Configuration Response			Search 1	B1
7	-3.361398µs		3C3C									Bus: USB Search: Bu	JS 🗸
8	-3.355401µs	43	FB FB FB F7				Transaction Packet		ACK	-		Events: 20	
BUS 1			?										
Display	_3 Label 2015	27	Position FB F7				 Transaction Packet		 NRDY				
On	USB		0 divs Set				Transacuori Packet		NRD F	-			
Waveform	/iew												
Bus Type		peed	Signal Type						····				
USB	•	USB 3.1 Gen 1 🔻	Single Diff.										
Source	Thre	hold		μs	-3 14	-2	μs	-1 µs	0's	1 µs	2 µs		
Ref 1	-	ov		al Zoom 🕂 📃	(1.00x zoom)						×		
											400 mV 300 mV		
Packet View				MULTIN AND AND AND	nill Maanaala	an Berna	ARCHARL AND A MARK	IN MARINA	MINH I DO BUDUNE HOL HAL	darat Awara a shin dar	1 (1 JUAL M 200 mV		
On						(+ -/-			- + + - + - + -			
A second second				h. Arina Mna Mna Maa M	INTER AND BUILD	î nimîr îl fin	AND AN DO WANT AND AN	ERMAN MARNE (naakaa malaafi ku mina dalami ah	tine for native mention	H WIN HI BINO TAY		
		Di	isplay Format										
			Bus v										
USB			sus 🔹										
		X_X_X_X_X_	ecode Format			XXX_X	X	//					
		1	Mixed Hex 🔻										
-2	9924	-2-901-05	-2-970 ps	-2.959 µs	-2.948 µs		-2.937 µs	-2.926	μs -2.915 μs	-2.904 µs	-2.893 µs		
Ref 1	Bus 1								Horizontal	Trigger	Acquisition		Preview
100 mV/div 50 GS/s usb31a1	USB						Add Add Add New New New Math Ref Bus		G SR: 6.25 GS/s 160 ps/s BL: 62.5 kpts 97.2.2		Auto, An Sample: 12 bits 0 Acris	alyze	

Searching the USB bus with decode speed USB 3.1 Gen 1 and packet view On for the TP packets. The results table at the top of the graticule.

Bus Decode	Results															×	Add I	New
Bus 1 (USB)															120	Packets Decoded	Cursors	Callout
Index																Data (h)		
1	-1.484µ	11	FB FB FB F7						Data Packe	et Header		-				Route String Res Number:04 Setu Reserved:00 Nu Interval done:1	Measure Results Table	Search Plot
2	-1.443997µ		5C 5C 5C F7													CA 67 A9 3E FF		More
3	-1.396µ		FD FD FD F7															
4	-1.388001µ	-	3C3C														Search 1	BI
5	-1.381999µ	-	FB FB FB F7						Isochronou	us Timestar	mp Packet			-		Isochronous Tirr Correction:17A9	Bus: USB Search: Bu Events: 7	ıs 🔻
6	-1.341998µ	-	3C3C														Events. 7	
7	-1.335999µ	48	FB FB FB F7						Transactio	n Packet		STATUS		-		Route String Res 00000 Reserved		
BUS 1				?												00 00 00 00 00		
Display	-1 Label 7µ		Position FE F7															
On	USB			Set												00 00 00 00 00 00		
Waveform V	/iew	peed	Signal Type															
Bus Type		USB 3.2 Gen 1 🔻	Cinala	Diff.		unio					Local distantion for the sec		-					
036	· ·	038 5.2 Gen 1 V	Ended											and the second second				
Source	Thre	shold		4 µs	-1.2 μs		-1	JS		-800 ns		-600 ns		-400 ns	-200 ns			
Ref 1	T	ov		Vertical Zoom	+ -	(1.00x z										× 400 mV		
Packet View		HANNAN MANAGAN				LAFILA	H		4477 W 147 W W W				EN AN I			300 mV 200 mV 200 mV 200 mV 200 mV 200 mV 200 mV 400 mV		
B USB	XXX)-	ا DXXXX-	isplay Format Bus Jecode Format Mixed Hex EXAMIN	× .944	ns	.)-() -928 n	XXXX 15	X()	-912 ns		-896 ns		-880 ns		64 ns	-848 ns		
	Bus 1 USB				1	2	З		Add New Math Ref			Horizo 200 ns SR: 6.2 RL: 12.	/div 2 μs 5 GS/s 160	ps/pt	gger) ∕ OV	Acquisition Auto, An Sample: 12 bits 0 Acqs	alyze	Preview

Searching the USB bus with decode speed USB 3.2 Gen 1 and packet view On for the TP packets. The results table at the top of the graticule.

Ethernet characteristics¹

Bus setup options

Characteristic	Description
Ethernet Source(s)	Analog channels Active Math channels
	Active Reference channels
Thresholds	Per-channel thresholds
Speed	10BASE-T
	100BASE-TX
Recommended Probing	Differential
Formats Available	Mixed Hex
	Hex
	Binary
	Mixed ASCII

Display modes

Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Results Table	Decoded packet data in a tabular view

Bus trigger options

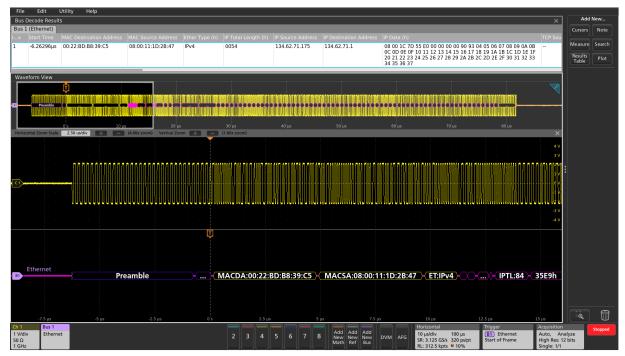
Characteristic	Description
Trigger On	Start Frame Delimiter
	MAC Addresses
	Q-Tag Control Information
	MAC Length/Type
	IPv4 Header
	TCP Header
	MAC Data
	TCP-IPv4 Client Data
	Idle
	End of Packet
	Frame Check Sequence (CRC) Error

Bus search options

Characteristic	Description
Search On	Start Frame Delimiter
	MAC Addresses
	Q-Tag Control Information
	MAC Length/Type
	IPv4 Header
	TCP Header
	MAC Data

Characteristic	Description
	TCP-IPv4 Client Data
	Idle
	End of Packet
	Frame Check Sequence (CRC) Error

Characteristic	Description
Decode Display	Start of Packet (green bar)
	Preamble (purple packet)
	SFD (purple packet)
	Address (yellow packet)
	EtherType (yellow packet)
	IP packet (purple packet)
	Data (cyan packet)
	IPv4 packet (pink packet)
	TCP packet (white packet)
	Frame Check Sequence (yellow packet)
	Error (red packet)
	End of packet (red bar)



Protocol Decode Results Table provides a time-stamped, tabular view of all captured packets on the 10BASE-T Ethernet bus

File	Edit U	Jtility Help								
Bus	Decode Results	;							X Add New	
Bus 3	L (Ethernet)								Cursors Note	
1	-635.1746ns	00:22:90:ED:45:C5	08:00:11:FF:01:CA	IPv4	0054	134.62.74.162	134.62.74.1	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Measure Search Results Table Plot	
2	9.604915µs	00:22:90:ED:45:C5	08:00:11:FF:01:CA	0088			-	-		81
3	19.84485µs	00:22:90:ED:45:C5	08:00:11:FF:01:CA	0054				-		
4	30.08472µs	00:22:90:ED:45:C5	08:00:11:FF:01:CA	IPv4	0054	134.62.74.162	134.62.74.1	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	-	
5	40.32477µs	00:22:90:ED:45:C5	08:00:11:FF:01:CA	IPv4	0054	134.62.74.162	134.62.74.1	-	0	
6	50.56483µs	00:22:90:ED:45:C5	08:00:11:FF:01:CA	IPv4	0054	134.62.74.162	134.62.74.1	-	2048	
Wav	eform View									
6										
Horiz	ontal Zoom Scale	250.00 ns/div	(40.00x zoom) Vertical Zoo	om (+) (-)	(1.00x zoom)				×	
1								╥╌┑╾┺╌┍┚╖┚┥┍┪┚╌╷┪╢╴╓╌┚╻╺┠╮	2V 1V 1V 	
L.	: V	75 µs 31 µs	· · · · · · · · · · · · · · · · · · ·]: ¥: ∳: 31	. Ы Ы Ы Ы Ы Ы Ы Ы Ы Ы Ы Ы Ы Ы Ы Ы Ы Ы Ы	31.75 μs	32 µs	μ μ μ μ μ μ μ μ μ 32.25 μs 32.50 μs 32.75 μs	-2 V	
	Ethernet									
BI	SFD SFD	MACDestAddr:00:22:9	0:ED:45:C5 MAC	Src Addr:08:0	0:11:FF:01:CA	ET:IPv4	XX IPTL:84 X IP	1:0000h 0000h 64 9989h 134.62.	74.162	
									ia, 11	
Ch 1 500 m 50 Ω 1 GHz					2 3 4	5 6 7 8	Add Add Add New Ref Bus	DV/M AFG 10 μs/div 100 μs B1 Ethernet μ SR: 3.125 GS/s 320 ps/pt Start of Frame H	Acquisition Auto, Analyze High Res: 12 bits Single: 0/1	

Triggering and automatically searching on the 100BASE-TX Ethernet bus.

SPMI characteristics¹ (Version 2.0)

Bus setup options

Characteristic	Description
SPMI Sources (Clock and Data)	Analog channels Digital channels Active Math channels Active Reference channels
Thresholds	Per-channel thresholds
Recommended Probing	Single-ended
Formats Available	Mixed Hex Hex Binary

Display modes

Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Results Table	Decoded packet data in a tabular view

Bus trigger options

Characteristic	Description
Trigger On	Sequence Start Condition (SSC)
	Reset
	Sleep
	Shutdown
	Wakeup
	Authenticate
	Master Read
	Master Write
	Register Read
	Register Write
	Extended Register Read
	Extended Register Write
	Extended Register Read Long

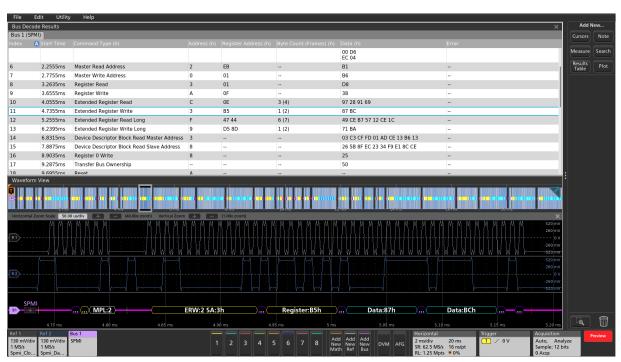
Characteristic	Description
	Extended Register Write Long
	Device Descriptor Block Master Read
	Device Descriptor Block Slave Read
	Register 0 Write
	Transfer Bus Ownership
	Parity Error

Bus search options

Characteristic	Description
Search On	Sequence Start Condition (SSC)
	Reset
	Sleep
	Shutdown
	Wakeup
	Authenticate
	Master Read
	Master Write
	Register Read
	Register Write
	Extended Register Read
	Extended Register Write
	Extended Register Read Long
	Extended Register Write Long
	Device Descriptor Block Master Read
	Device Descriptor Block Slave Read
	Register 0 Write
	Transfer Bus Ownership
	Parity Error

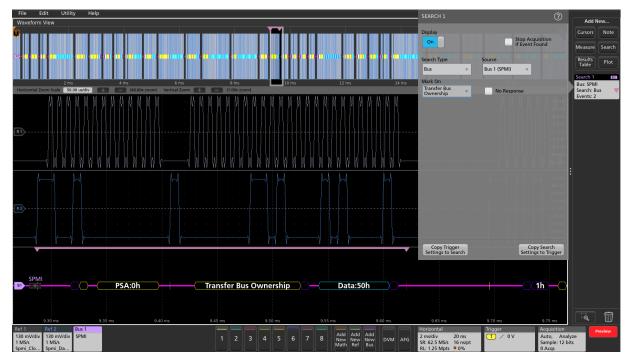
Bus decode

Characteristic	Description
Decode Display	Arbitration Start (yellow bar)
	Connect Bit (purple packet)
	Master ID (purple packet)
	Alert Bit (yellow packet)
	Slave Request Bit (yellow packet)
	Master Priority Level (gray packet)
	SSC (green bar)
	Command Frame, including Byte Count ² (yellow packet)
	Address (yellow packet)
	Data (cyan packet)
	Parity (purple packet)
	Ack/Nack (purple packet)
	Parity error (red packet)
	End of packet (red bar)



Protocol Decode Results Table provides a time-stamped, tabular view of all captured packets on the SPMI bus.

² The actual decimal Byte Count is displayed in Mixed Hex format, but the raw value is shown in Binary and Hex formats.



Automatically searching the SPMI bus for the Transfer Bus Ownership command

SpaceWire characteristics

Bus setup options

Characteristic	Description
SpaceWire Sources	Analog Channels
(Strobe and Data)	Digital Channels
	Active Math Channels
	Active Reference Channels
Thresholds	Per-Channel Thresholds
Recommended Probing	Differential
Address/Data Formats	Hex
Available	Binary

Display modes

Characteristic	Description				
Bus	Bus Only				
Bus and Waveforms	Simultaneous display of bus and digital waveforms				
Results Table	Decoded packet data in a tabular view				

Bus search options

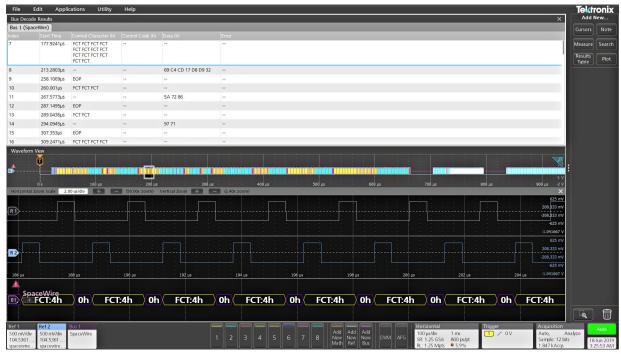
Characteristic	Description
Search On	Synchronization
	Control Code

Characteristic	Description
	Control Character
	Data
	Errors

Characteristic	Description
Maximum Clock/Data Rate	2 Mbits/sec to 200 Mbits/sec
Decode Display	Null
	Control Character
	Control Code
	FCT
	Time-Code
	Parity
	Data-Control Flag
	Data
	End Of Packet
	Error End Of Packet
	Escape Sequence
	Escape Error
	Start FCT
	Start NULL

File	Edit	Applications	Utility	Help						SEARCH 1		?	— 🗆 X
Waveform	n View												Add New
	ů.									Display		∇	Cursors Note
										On	Stop	Acquisition ent Found	Measure Search
A													Results Di i
											Source	Solution of the	Table Plot
									· ·	Bus v	Bus 1 (SpaceWire) 🔻	-1.5 V	Search 1 81
	0 s Zoom Sca		100 µs	200 µs — (50.00x zoom) Vertical Z	300 µs Zoom +	400 µs	500 µs	600	μs	Mark On	500 µs	900 us -2 V	Bus: SpaceWire
Horizontal	200in Sca	2.00 05/01/		(S0.00X 200III) Verucal 2						Control Code 🛛 👻			Search: Bus V Events: 1
									<u> </u>	Control Code Type		625 mV	
										Time Code 🔹		- 208.333 mV	
R 1										Time Code		0 V	
										Binary H		-208.333 mV -416.667 mV	
		. —			-					XX XXXX X	×	-625 mV	
												-833.333 mV	
		108 µs		110 µs 112	μς 114 μς	116 µs		118 µs	120 µs			-110+1007 V	:
									• • P			625 mV	
												416.667 mV	
R 2												o v	
									· · ·			-208.333 mV	
												-416:007 mV -625 mV	
1												-833.333 mV	
	e e :		- 8 - 8 -									-1.041667 V	
^ sn	2001/1	10											
B1 +		re Data:5	h	χχ	ESC:7h 0	h) 1	ime-Code	:3Ch	X.	Copy Trigger Settings to Search	FCT:4 Cop	y Search as to Trigger	
										Setungs to Search	Security	a to mgger	
ł.													
													i
Ref 1	Ref 2	Bus 1								Horizontal	Trigger	Acquisition	Auto
500 mV/div	500 m	W/div SpaceWire	2			4 5 6	7 8 Ne	w New New	DVM AFG	100 µs/div 1 ms	1 / OV	Auto, A	nalyze
104.5361 . spacewire.	104.53 spacev						Ma Ma	th Ref Bus		SR: 1.25 GS/s 800 ps/pt RL: 1.25 Mpts 95.9%		Sample: 12 bit 2.575 kAcqs	s 18 Jun 2019 3:26:41 AM

Searching on a specific data pattern on the SpaceWire bus and automatically searching on Sync.



The Protocol Decode Results Table provides a time-stamped, tabular view of all captured packets on the SpaceWire bus.

Automotive Ethernet (10BASE-T1S) characteristics

Bus setup options

Characteristic	Description			
10Base-T1S Sources	Analog channels			
	Digital channels			
	Active Math channels			
	Active Reference channels			
Thresholds	Per-channel Thresholds			
Probing	Single-ended			
	Differential			
Bit Rate	Upto 1Gbps			
Packet View	On			
	Off			
Formats Available	Hex			
	Binary			
	Mixed Hex			

Display modes

Characteristic Description	
Bus	Bus only
Results Table	Decoded packet data in a tabular view

Bus search options

Characteristic	Description
Search On	SYNC/Commit
	Start of Stream Delimiter
	MAC address: Mac Address Source, Mac Address destination
	Beacon
	Ether Type: IPv4 and IPv6 with Header Type: TCP, UDP, ICMP
	Payload: Payload Bytes, Payload value
	Data: Data Bytes, Data
	End of stream Delimiter.
	End of stream Delimiter Ok
	Errors: CRC, ESDERR, ESDJAB, Checksum, Any

Bus trigger options

Characteristic	Description
Trigger On	SYNC/Commit
	Start of Stream Delimiter
	Preamble
	Beacon
	End of stream Delimiter.
	End of stream Delimiter Ok
	Errors: ESDERR, ESDJAB



10BASE-T1S bus decode and results table in a tabular format. Searching the 10BASE-T1S bus decode with search on Sync/Commit with 34 occurrences shown on the search badge.

File E	dit Applic	ations Utility Help						– 🗆 ×
Bus Decode	e Results					×	Add	d New
Bus 1 (10 Ba	ase-T15)					17 Packets Decoder	Cursor	s Callout
			MAC Destination Address	MAC Source Address				
7	-412.3883µs	SYNC/Commit SYNC/Commit SSD SSD ESD ESDOK	20:44:B4:C0:7C:88	2A:FC:1A:CB:1B:DF	001D		Measur	re Search
8	-374.439µs	SYNC/Commit SYNC/Commit SSD SSD ESD ESDOK	15:70:C8:6F:99:F2	04:77:20:CA:D7:59	IPv4	IP Version:4 IP Header Length:5 IP Differentiated Services:26 IP Explicit	Results	
9	-320.1176µs	SYNC/Commit SYNC/Commit SSD SSD ESD ESDOK	0F:5C:B3:2B:39:35	8A:86:DE:F2:08:B7	IPv4	IP Version:4 IP Header Length:6 IP Differentiated Services:21 IP Explicit TCP Source Port:7F34 TCP Destr	Table	
10	-253.3256µs	SYNC/Commit SYNC/Commit SSD SSD ESD ESDOK	34:46:DE:5C:68:36	07:F4:7C:B4:E7:DD	IPv4	IP Version:4 IP Header Length:6 IP Differentiated Services:39 IP Explicit		More
11	-197.909µs	SYNC/Commit SYNC/Commit SSD SSD ESD ESDOK	DE:21:E8:62:03:4E	BE:74:EF:20:39:2C	IPv4	IP Version:4 IP Header Length:6 IP Differentiat		
12	-146.1885µs	SYNC/Commit SYNC/Commit SSD SSD ESD ESDOK	ED:0D:FC:35:7C:42	B6:2C:36:C2:3C:9D	IPv6	IP Version:6 IP Traffic Class:05 IP Flow Label:6	? rch	
13	-70.74131µs	SYNC/Commit SYNC/Commit SSD SSD ESD ESDOK	AA:F3:91:F6:BC:2C	E4:6C:8A:E4:E3:B7	IPv6	IP Version:6 IP Traffic Class:26 IP Flow Label:E SETTINGS	Aut rch:	to Ethernet
14	-2.717447µs	SYNC/Commit SYNC/Commit SSD SSD ESD ESDOK	C2:A3:6F:9A:9D:8E	40:41:7C:37:8C:78	IPv6	IP Version:6 IP Traffic Class:DD IP Flow Label: Source 0082 IP Next Header:UDP IP Hop Limit;CT IP 7 Trigger Type Source 6010:3472:5641:ADCS: C838:660:P9636:7203 Bus Bus 1 (AutoEth *	Events: .	
15	68.47456µs	SYNC/Commit SYNC/Commit SSD SSD ESD ESDOK	AC:BC:49:10:27:4A	E3:D9:4D:99:81:3C	IPv6	IP Version:6 IP Traffic Class:99 IP Flow Label:E Trigger On		
16	125.1306µs	SYNC/Commit SYNC/Commit SSD SSD ESD ESDOK	20:44:B4:C0:7C:88	2A:FC:1A:CB:1B:DF	001D	- Preamble		
17	163.0747µs	SYNC/Commit SYNC/Commit SSD SSD ESD ESDOK	15:70:C8:6F:99:F2	04:77:20:CA:D7:59	IPv4	IP Version:4 IP Header Length:5 IP Differentiat		
Waveform								
	-700 µs	-600 µs -500 µs	-400 µs	-300 µs		-200 µs -100 µs 200	5	
	com Scale 400.0				WWW			
10 E B1. SS	Base-T1S	Preamb	ole:5555555555	5D5h		MAC Destination Address:C2:A3:6F:9A:9D:8E		
-2.4 µs		-2 µs -1.6 µs -	1.2 µs -8	00 ns	-400 ns	NoDe & HolDoFF	>	
Ch 1 250 mV/div 1 MΩ 500 MHz B	Bus 1 Auto Ethe			2	3 4	Addl Add Addl Addl Addl Addl Addl Addl Addl Addl Addl Acquisition New Series Series		Stopped

10BASE-T1S bus decode with trigger on the preamble.

Automotive Ethernet (100BASE-T1) characteristics (Version BRR V3.2)

Bus setup options

Characteristic	Description
Ethernet Source(s)	Analog Channels Active Math Channels
	Active Reference Channels
Thresholds	Per-channel Thresholds
Speed	100 Mbits/sec
Recommended Probing	Differential
Formats Available	Mixed Hex
	Hex
	Binary
	Mixed ASCII

Bus decode

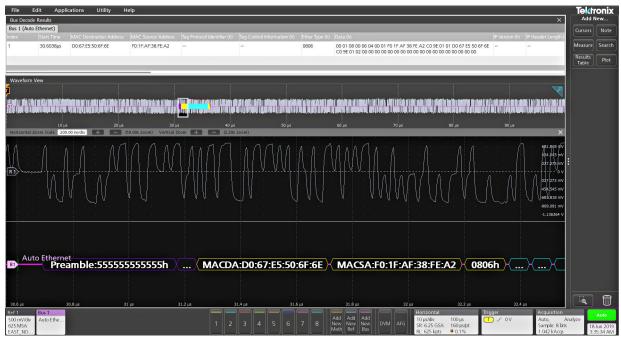
Characteristic	Description
Maximum Clock/Data Rate	100 Mbits/sec
Decode Display	Start of Packet (green bar)
	Preamble (purple packet)
	SFD (purple packet)
	Address (yellow packet)
	EtherType (yellow packet)
	IP packet (purple packet)
	Data (cyan packet)
	IPv4 packet (pink packet)
	TCP packet (white packet)
	Frame Check Sequence (yellow packet)
	Error (red packet)
	End of packet (red bar)

Display modes

Characteristic	Description
Bus	Bus Only
Results Table	Decoded packet data in a tabular view

Bus search options

Characteristic	Description
Search On	Start of Frame
	Start of Frame Delimiter
	MAC Addresses
	Q-Tag Control Information
	MAC Length/Type
	IPv4 Header
	TCP Header
	MAC Data
	TCP-IPv4 Client Data
	End of Packet
	Frame Check Sequence (CRC) Error



The Protocol Decode Results Table provides a time-stamped, tabular view of all captured packets on the Automotive Ethernet (100BASE-T1) bus.

File Edit Applications Utility Help Waveform Yeav	SEARCH 1	_ 🗔 X
	Display On If Event Found	Cursors Note
יון אינט אינט אונט אינט אינט אינט אינט אינט אינט אינט אי		Measure Search Results
and the second secon	Bus T Bus 1 (AutoEth T	Table Plot
10 μs 20 μs 30 μs 30 μs 50 μs 50 μs 60 μs 70 μs	Mark On	Search 1 81 Bus: Auto Ethernet
	Start of Frame	Search: Bus V
	Start of Frame	
	Start of Frame Delimiter	
	MAC Address	
	Q-Tag Control Information	
	MAC Length/Type	:
	IP Header	
	TCP Header	
	Client Data	
	End of Packet	
	FCS (CRC) Error	
Auto Ethernet		
Preamble:555555555555555555555555555555555555	AF:38:FE:A2 🗶 0806h 🗶 🗶 🗶	
	Copy Trigger Copy Search Settings to Search Settings to Trigger	
30.6µs 30.8µs 31.2µs 31.4µs 31.8µs 31.8µs Ref 1 Bus 1	32 µs 32.2 µs 32.4 µs Horizontal Trigger Acquisition	
500 mV/div Auto Ethe 1 2 3 4 5 6 7 8 New New New DVM AF	10 us/div 100 us 10 Z 0 V Auto	Analyze
east_no	RL: 625 kpts 9 0.1% Sample 8 to 1.372 kAcqs	ts 18 Jun 2019 3:35:53 AM

Searching on a specific data pattern on the Automotive Ethernet (100BASE-T1) bus and automatically searching on Start of Frame.

8b10b Characteristics (Line encoding)

Bus setup options

Characteristic	Description
8b10b Sources	Analog Channels
(Strobe and Data)	Digital Channels
	Active Math Channels
	Active Reference Channels
Thresholds	Per-Channel Thresholds
Recommended Probing	Differential
Formats Available	Hex
	Binary
	Symbolic

Characteristic	Description
Decode Display	Control Symbol (yellow packet) Data Symbol (cyan packet)
Error Handling	Invalid Symbols Running Disparity (6 bit and 4 bit)

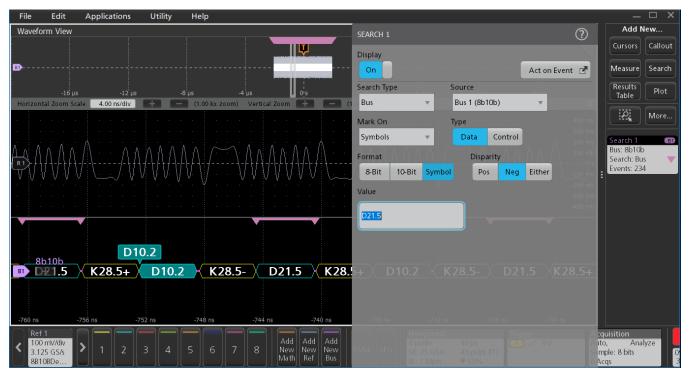
Display modes

Characteristic	Description
Bus	Bus Only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Results Table	Decoded packet data in a tabular view

Bus search options

Characteristic	Description	
Search On	Symbols [Format:8bit,10bit&symbol]	
	Errors	

Characteristic	Description
Maximum Clock/Data Rate	1 Tbits/sec
Table continued	



Searching on a specific data symbol in symbol format on a 8b10b bus



The Protocol Decode results table provides time-stamped, tabular view of all captured packets on a 8b10b bus

NFC characteristics

Characteristic	Description
NFC sources	 Analog channels (Spectrum View to be turned on) Active Math channels Active Reference channels
Salient features	 Decode capability for NFC protocol Decode capability for ISO/IEC 15693, ISO/ IEC14443A, ISO/IEC14443B, and FeliCa Standards Decode capability for Command and Response packets Search capability for SOC, SOS, SYNC, EOC, SOF, AFI, PUPi, Identifier, Payload, UID, EOF, DATa, and EOS Search capability for different ISO/IEC 14443A commands like REQ, WUPA, Proprietary, SELECT, and HLTA
	 Search capability for different ISO/IEC 15693, ISO/IEC 14443B, and FeliCa commands Search capability for Response packets Search capability for Errors like CRC, Parity
Product differentiators	 Perform NFC protocol decode and search seamlessly with a single oscilloscope instrument Analyze and correlate analog RF and digital signals simultaneously for enhanced insight Save transfer time and memory of large recordings with hardware DDC (digital downconverter) on each input Trigger on 13.56 MHz RF envelope using RF vs. Time traces and triggers, reducing the need to trigger on other I/O signals
Recommended probing	 EMI-NF-PROBE near-field probe set for contact-less probing and manual troubleshooting TPP1000 probe for conducted probing

Display Label Position 0 divs Set to 0 NFC On Data Rate Bus Type Standard NFC 15693 106 kb/s w w Source Response Threshold Command Threshold Ch 1 1 V 100 mV w Transition For '0' Tolerance 10% Display Format Bus w Decode Format Hex w Display Label Position -3.08 divs Set to 0 NFC On Standard Data Rate Bus Type NFC Ŧ 14443A 106 kb/s w Source Command Threshold Response Threshold Ch 1 \mathbf{v} 1 V 100 mV Transition For '0' Decode Start Edge Tolerance 10% 2 Response Load Demod Display Format Yes Bus No . Decode Format Mixed Hex w ? BUS 1 Label Display Position 0 divs Set to 0 On NFC Data Rate Bus Type Standard 14443B 106 kb/s NFC w $\overline{\mathbf{v}}$ Source Ch 1 w Polarity Threshold Normal Inverted 175 mV Command οv Inverted Response Normal Display Format Response Load Demod No Bus Yes . Decode Format Mixed Hex

Table continued...

Characteristic

Bus setup

Description

Characteristic	Description
	BUS 1
	Display Label Position On NFC O divs Set to 0
	Bus Type Standard Data Rate NFC ▼ FeliCa ▼ 212 kb/s
	Source Tolerance Ch 1 = 10%
	Threshold Transition For '0' Decode Start Edge Command 1 V 1 1
	Response 100 mV / 1
	Display Format Bus 🗸
	Decode Format
Formats available	HexBinaryMixed Hex

Characteristic	Description
Bus	Bus only
Result Table	Decoded packet data in a tabular view with columns containing:
	• Flag
	Command Code
	Mask Value LSB MSB
	Mask Length
	DSFID
	Message LSB MSB
	Get Information Parameter Request
	Custom Request Parameter LSB MSB
	IC MFG Code
	Length
	Key ID
	• CSI
	• UID
	Data LSB MSB
	Optional AFI
	• AFI
	Number Of Block
	First Block
	Error Code
	Information Flags
	VICC Memory Size

Characteristic	Description
	• SEL
	• NVB
	Each Bit RFU
	Propriety Coding
	UID Size
	• SAK
	Bit Frame AntiCollision
	Parity
	Response Code
	• PARAM
	• Data
	Pseudo Unique PICC Identifier
	Identifier
	• Param1
	• Param2
	• Param3
	Param4
	Higher Layer INF
	Attrib Info
	Higher Layer Response
	CRC_B_APP
	Application Data
	Number of Applications
	Bit Rate Capability
	Max Frame Size
	Protocol Type
	Frame Waiting time Integer
	Application Data Coding
	NAD Frame Option
	CID Frame Option
	Start up Frame Guard Time
	SYNC Bet
	BStBRt
	• BRS
	• BSi • BRi
	• DIDi
	DIDI DIDt
	• FSL
	General Byte NADi
	NADI NADt

Charac	teristic		Descript	tion					Characteristic	•	Description			
			 nfcic nfcic nfcic PPi PPt 	l3t							 PFB Payload TO Extra Da CRC Error Unframe 			
	-												Add New	
Bus Decode	Results				X									
Bus 1 (NFC)					66 Packets Decoded					3.560 MHz		-o dbii	Cursors Callout	
1	-49.3056ms	26		Data (II)								-16 dBm	Measure Search	
2	-49.13885ms	20			00									
3	-46.59802ms	03			10							-26 dBm	Results Table Plot	
4	-46.30107ms			14 95 EC 08 44	11001							ac day		
	-43.84868ms	93	AE89056316		100110000							- 36 dBm	More	
6	-42.98824ms				010							-46 dBm	Search 1 🚯	
7		26											Bus: NFC	
8	-40.00734ms				00							-56 dBm	Search: Bus 🛛 🔍	
9	-37.46652ms	93			10				. 6			· · · · · · · · · · · · · · · · · · ·	Events: 33	
10	-37.16955ms			14 95 EC 08 44	11001				M/NV	'IAA		-66 dBm		
11	-34.71718ms	93	AE89056316		100110000				N	1 Y M		-76 dBm		
12	-33.85673ms				010			LAI.	N MAA N	N. 17170a.	ANA Shire	H Land		
13	-31.04259ms	26				into harden solution.	Milliona ANAV WAS IN ON	AND Y			HALVE WARMING	t, kt. MANAA innel A. Makk, on de		
14	-30.87582ms				00	a and share that a same w	okali JA	ųr.		P	en ener 14	ANT THE PARTY AND A		
15	-28.33501ms	93			10	1 6 6 1 7 1 7 1 1 6 7 1	ale walfel a react					1 ¹¹ · · · · · · · · · · · · · · · · · ·		
16	-28.03803ms			14 95 EC 08 44		11.06 MHz						16.06 MHz		
17	-25.58568ms	93	AE89056316		100110000	Waveform View								
18	-24.72518ms				010			⊢ ì ⊢						
19	-21.91108ms	26					-							
20	-21.74432ms				00	B1-RSP		20						
21	-19.2035ms	93			10	Horizontal Zoom Scal	e 203.25 us/div	+	(49.20x zoom) Vertica	al Zoom	(1.00x zoom)	X		
22	-18.90654ms			14 95 EC 08 44	11001			. mo	and the second second second second	nindinina i adda anda a		143.799 mV		
23	-16.45417ms	93	AE89056316		100110000							107.849 mV		
24	-15.59372ms				010							71.900 mV 35.950 mV		
25	-12.77958ms	26				MD CMD						35.950 mV		
26	-12.6128ms				0 0						ing, Strange	394.024 mV		
	-10.07199ms	93			10							295.518 mV		
28	-9.775037ms			14 95 EC 08 44	11001							197.012 mV		
29	-7.322668ms	93	AE89056316		100110000							98.506 mV		
30	-6.462237ms				010			V						
31	-3.648081ms	26				B1-CMD		-	AE89056	316h				
32	-3.481303ms				00									
33	-940.4854µs	93			10	B1-RSP					-6.504064 ms -6.300812			
4/				1/ 05 FC 08 //	11001	-7.723576 ms	-7.520324 ms -7.3	17072 m			W.			
A Math 5 1 V/div Bpskdem Bus 1	Math 6 1 V/div ^[coeffile. Bus 1	Math 7 B 1 V/div 30*Math6 Bus 1	as 1	2	3 4 5 6	5 7 8 Add Nev Mat	d Add Add w New New th Ref Bus D'	VM A	Spectrum CF: 13.5600000 MHz Span: 5.00000 MHz RBW: 5.00 kHz	SR: 62.5 MS/s 1	Trigger 100 ms 1 2 0 16 ns/pt 50%	Acquisition V Manual, Analyz Sample: 12 bits O Acqs	re Preview 19 Mar 2023 9:30:16 AM	

The results table provides time-stamped, tabular view of all captured packets on the NFC bus. 33 occurrences of the event is searched on SOC on the command lane.

File	Edit	Applications	Utility	Help																			
Spectru	m View				×	Bus Deco	ode Resu	lts													×	Add M	lew
C 1 N			6 MHziz			Bus 1 (NF	C)														13 Packets Decoded	Cursors	Callout
			dBm n		1	Index		Time 2357µs	Comma REQB	nd Code (h) Ap 00		amily Iden	tifier (h)				nique PICC Identifi		per of Applications (h)			
· ·						2																Measure	Search
						2			Slot Ma Slot Ma													Results	Plot
						4			Slot Ma													Table	=
						5			Slot Ma													0	More
					-16 dBm	6			Slot Ma														
						7			Slot Ma														
· ·						8			Slot Ma														
					-26 dBm	9			Slot Ma														
						10			Slot Ma														
						11	_		Slot Ma														
					-36 dBm	12		1635ms	_						Basic AT	ов	9C013C9	16			80		
· ·						13			Slot Ma	rker													
										_	_				_	_	_					:	
					-46 dBm	Wavefor	m View][]				<u> </u> .	
· ·		s s ∭1⊾					Ū,														200		
						C)															0	,	
					-56 dBm						÷ .					1 1					-200 ml	<mark>(</mark>	
· ·		. . //// 18	6				0.5		201	16						0116	100 11	6 120	116	140 115	160 mg - 460 mi		
		. 	Ma.											1 : :							188.814 m\ 178.877 m\		
			llith.		-66 dBm																168.989 m		
-		- M DE II	WINDA		·	Ś	. I							<u>ا</u>							159.002 m	1	
	1	2010		Multi					: :			1					1				77.813 m		
	. iuM		5 N. H.	1111WPhor	176 dBm	M 7	5P					+		+		t					-25,938 m		
	, diffi	Unit e e e	- 11110	Walder fr	$P_{\rm MMP}$																10 -77,813 mV		
<u>н</u>	A N N M I			u in the definition	aun t																		
11.M	WINGT				-86 倍益	B1-CMD		FC															
MARTY	dd frir It				1.1.1.1	BI-CIVIL	- T																
8.6 MH	<u> </u>			10.	6 MHz	B1-RSP																	
8.6 MH		Math 1 💦 Math	2 M	ath 3										i		Spectrum		Horizontal		Trigger	Acquisition		
/ 100	mV/div 4	4.968 mV/div 6.252	mV/div 1 \	V/div	\$			4 5				Add A	ld Add w New			CF: 13.5600		20 ms/div	200 ms		Manual, A	.nalyze	Preview
		Askdemo ^[coet Bus 1 Bus 1)*Fabs(^ is 1				4 5				vlath R				Span: 10.00 RBW: 2.00 k		SR: 250 MS/s RL: 50 Mpts	4 ns/pt ₩ 10%		Sample: 12 bit Single: 0 /1	5	
					\bigcirc	\square																	

Result table for NFC 14443B

Bus Decode	Results			X				×	Add New
Bus 1 (NFC)				3 Packets Decoded	N		13-13.559 MHz.3.702 MHz		Cursors Callou
ndex		Command Code (h)		Payload (Polling) (h)		-49.7 dBm	-49/22.3 dBm 49.6 dBm	• • • • • • • • • • 20 dBm	Measure Searc
	33.91879µs		 B24D B24D	Payload0:00 Payload1:FF Payload2:FF Paylo Payload Start Bit:01 NFCID2:05FE69C11971				10 dBm	
2	2.78568ms 144.4999ms		 B24D	Payload Start Bit:01 NFCID2:05FE69C1197				10 dBW	Results Table Plot
,	144.45551115							0 dBm	More
								10 dBm	
								-20 dBm	
								~30 dBm	
								-30 0511	
								40 dBm	
								-50 dBm	
							ta ang ang ang ang ang ang ang ang ang an		
					MURSHAMMUM	MUMARAMAANIMI	a MAMAMAY WAALAA AMA AMA AMA	ha MANGMANA MARAA	
					Waveform View				
					ET-CMD				
					G:				
					E1-RSP 20 ms	40 ms 60 ms	80 ms 100 ms 120 ms	140 ms 160 ms 180 ms	
					Horizontal Zoom Scale 2	2.20 ms/div + -	9.09x zoom) Vertical Zoom 🕂	- (1.10x zoom) X	
								5.455 V 1.818 V	
					C 3			-1.818 V	
								-5.455 V -9.091 V	
								-9.091 V 2.083073.V	
								1.986186 V	
								1.889299 V 1.792412 V	
					CMD/RSP			1.695525 V	
					NFC				
					B1-CMD				
				•	B1-RSP	ns -2.2 ms 0	is 2.2 ms 4.4 ms 6.6 ms	s 8.8 ms 11 ms	

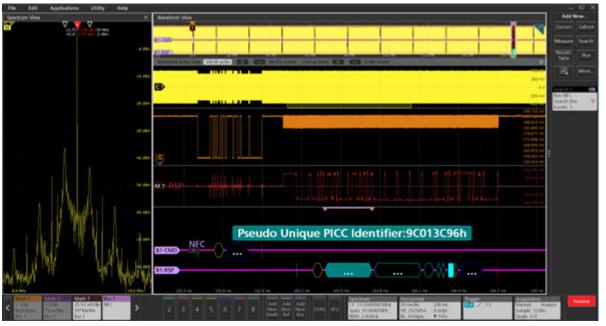
FeliCa decode with result table

Characteristic	Description	
Maximum Data Rate	Max data rate for NFC Type B command is 1.7 Mbps	
Result table	SOF(Green Bar)	
	SOC(Green Bar)	
	SOS(Green Bar)	
	commandCode(Yellow Packet)	
	flag(Yellow Packet)	
	maskValue(Yellow Packet)	
	maskLength(Yellow Packet)	
	optionalAFI(Yellow Packet)	
	afi(Yellow Packet)	
	noOfBlock(Yellow Packet)	
	dataVariable(Cyan Packet)	
	firstBlock(Yellow Packet)	
	errorCode(Yellow Packet)	
	infoFlags(Yellow Packet)	
	 viccMemorySize(Yellow Packet) 	
	dsfid(Yellow Packet)	
	message(Yellow Packet)	
	Get Information Parameter Request(Yellow Packet)	
	customRequestParameter(Yellow Packet)	
	icMFGCode(Yellow Packet)	
	csi(Yellow Packet)	
	Iength(Yellow Packet)	
	keyID(Yellow Packet)	
	• uid(Cyan Packet)	
	Parity(BusMisc)	
	SEL(Yellow Packet)	
	NVB(Yellow Packet)	
	EachBitRFU(Yellow Packet)	
	ProprietyCoding(Yellow Packet)	
	size_UID(Yellow Packet)	
	SAK(Yellow Packet)	
	BitFrameAntiCollision(Yellow Packet)	
	• uid0(Cyan Packet)	
	• uid1(Cyan Packet)	
	• uid2(Cyan Packet)	
	• uid3(Cyan Packet)	
	• uid4(Cyan Packet)	
	RFU(Yellow Packet)	
	responseCode(Yellow Packet)	
	afi1(Yellow Packet)	Table cont

Characteristic	Description
	PARAM(Yellow Packet)
	Param1(Yellow Packet)
	Param2(Yellow Packet)
	Param3(Yellow Packet)
	Param4(Yellow Packet)
	INF(Yellow Packet)
	Data(Cyan Packet)
	Identifier(Cyan Packet)
	PUPI(Cyan Packet)
	APPDATA(Cyan Packet)
	 attriblnfo(Cyan Packet)
	 higherLayerResponse(Cyan Packet)
	CRC_B_APP(Blue Packet)
	 numberOfApp(Cyan Packet)
	BR(Cyan Packet)
	 maxFrameSize(Cyan Packet)
	PROTOCOLTYPE(Cyan Packet)
	FWI(Cyan Packet)
	ADC(Cyan Packet)
	foNAD(Cyan Packet)
	foCID(Cyan Packet)
	SFGI(Cyan Packet)
	BSt(Cyan Packet)
	BRt(Cyan Packet)
	BRS(Cyan Packet)
	BSi(Cyan Packet)
	BRi(Cyan Packet)
	CMD(Yellow Packet)
	DIDi(Cyan Packet)
	DIDt(Cyan Packet)
	extra_data(Cyan Packet)
	FSL(Cyan Packet)
	GB(Cyan Packet)
	NADi(Cyan Packet)
	NADt(Cyan Packet)nfcid2t(Cyan Packet)
	nfcid3t(Cyan Packet)nfcid3i(Cyan Packet)
	PPi(Cyan Packet)
	PPt(Cyan Packet)
	PFB(Cyan Packet)
	payload1(Cyan Packet)
	payload (Cyan Packet) payload2(Cyan Packet)
Table and the	
Table continued	

Characteristic	Description	
	• payload3(Cyan Packet)	
	payload4(Cyan Packet)	
	 payloadTSN(Cyan Packet) 	
	payloadBit(Cyan Packet)	
	NFCID2(Cyan Packet)	
	Pad(Cyan Packet)	
	RSP(Yellow Packet)	
	SYNC(BusStart)	
	TO(Cyan Packet)	
	felicaData(Cyan Packet)	
	crc(Blue Packet)	
	EOC(Red Bar)	
	EOF(Red Bar)	
	EOS(Red Bar)	

Characteristic	Description
Search ON	• SOF
	• SOC
	• SOS
	• Data
	Payload
	Command Code
	Response Code
	• UID
	• AFI
	Identifier
	• PUPI
	• EOC
	• EOF
	• EOS
	Errors



NFC Search for PUPI



NFC Search for SYNC

NRZ Characteristics (Line encoding)

Bus setup options

Characteristic	Description
NRZ Source(s)	Analog Channels
	Digital Channels
	Active Math Channels
	Active Reference Channels
Thresholds	Per-channel Thresholds
Recommended Probing	Differential
Bit Order	MSB First
	LSB First
Polarity	Normal
	Invert
Formats Available	Hex
	Binary

Bus decode

Characteristic	Description
Maximum Clock/Data Rate	1Gbits/sec
Decode Display	Data (cyan packet)

Display modes

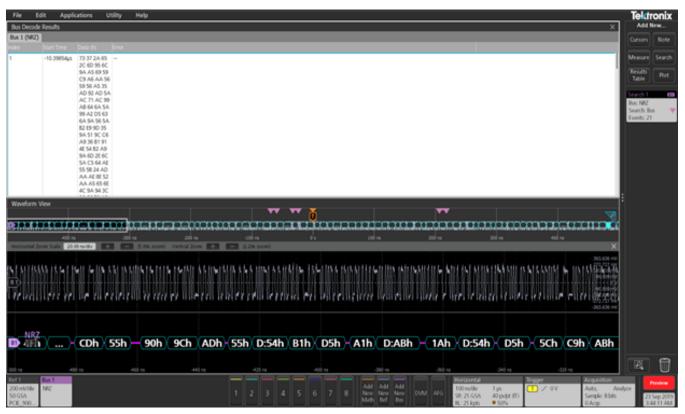
Characteristic	Description
Bus	Bus Only
Bus and Waveforms	Simultaneous display of bus and digital waveforms.
Results Table	Decoded packet data in a tabular view

Bus search options

Characteristic	Description
Search On	Data Bytes [Maximum 5]

File Edit Applications Utility Help	SEARCH 1	0 - • ×
Bus Decode Results		Add New
Ba1(962)	Display	Cursons Note
Index Start Time Data (N) Kinor	On Art on	tient of
1 10.39854ga 73.372.4.65		Measure Search
9A.A5.03.59	Search Type Source	Results Table Plot
C9 A6 AA 56 59 56 A5 35	Bus v Bus 1 (NR2) v	
AD 92 AD 54, AC 71 AC 99	Mark On	Search 1 CD
A8 64 6A 5A	Data	Bus: NRZ Search: Bus
99 A 2 D5 63 6 A 35 55 5A	Data Bytes Data	Events: 21
12 (3140 25 SA 51 9C C6	1 Dinary Hex 48	$\langle \rangle$
A9368191	0100 1011 48	
45 4 62 A9 9A 40 28 6C		
5A (5 46 AE 55 58 34 AD		
AA AE RE S2		
AA AS 65 62 4C 9A 94 3C		
Waveform View		
		5.2
		
100 an 100 m 000 m 000 m 100	- Marine Malan	
Norizonial Zoom Stale 20 00 m/dw 💽 🔚 8.00 zoom). Vertical Zoom 🛃 💼 0.20 zoom)		
INT AT 19889 TAST TARE AND AND AND A STATES TARENTA AND A SUBJECT AND	 Manual Manual Strength Processing and the strength 	
	-	
Menality of the contraction of the end of the destruction of the end of the second of the second of the second of	Care Strate States at a strate of the second	
الاحتاق والمتحد والمتحال والمتحد والمت		
NRZ		
D 4	Copy Nigger D.Sh - SCh Copy	Search
	Settings to Search Settings	to Trigger
0 000 00 000 00 000 00 000 00 000 00 00	ao na	
200 mMAir 192	100.msdav 1 ps 🚺 🖉 0 V 🛛 A	uto, Analyze
40 GSA 1 2 3 4 5 6 7 8 New New Deal AF	36,25,035, 499568,917 34	ample: 8 bits 23 Sep 2019 Aces 3 44 23 AM

Searching on a specific data symbol in symbol format in the NRZ bus



The Protocol Decode results table provides time-stamped, tabular view of all captured packets on the NRZ bus

PCIe Characteristics (Gen 1, Gen 2, and Gen 3)

Bus setup options

Characteristic	Description
PCIe Source(s)	Analog channels
	Digital channels
	Active Math channels
	Active Reference channels
Thresholds	Per-channel thresholds
Speed	2.5 Gbps
	5 Gbps
	8 Gbps
Link Width	X1
Packet View	On
	Off
Formats Available	Hex
	Binary
	Mixed Hex

Characteristic	Description
Results Table	Decoded packet data in a tabular view

Bus Search options

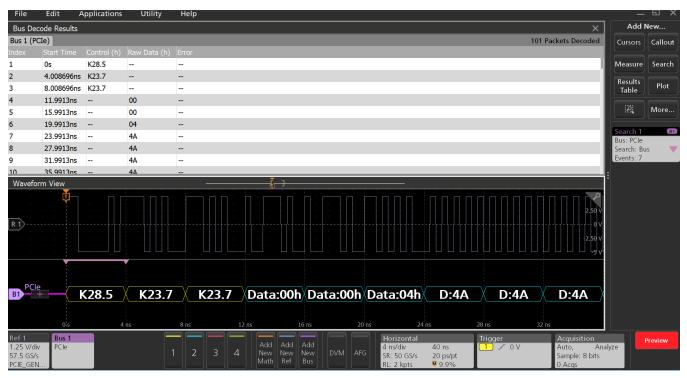
Characteristic	Description
Search On	Control Characters
	COM, EDB, END, FTS, IDL, PAD, SDP, SKP, STP, EIE, Any • Sync Header • DLLP
	ACK/NAK, Power Management, Flow Control TLP
	Memory, I/O, Config, Message, Completion, Atomic Operation, Prefix, Any • Ordered Set
	TS1, TS2, EIOS, EIEOS, FTS, SKP, SDSCustom PatternErrors
	CRC, LCRC, ECRC, Frame Length, Disparity, Symbol, Packet

Display modes

Characteristic	Description
Bus	Bus
	Bus and Waveforms
Table continued	



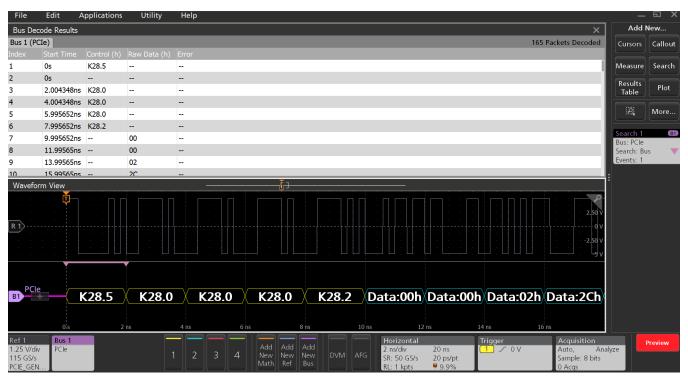
PCIe Gen 1 bus setup and MixedHex display, showing decode with packet view on. K28.5 searched with 7 occurrences.



PCIe Gen 1 bus setup and MixedHex display, showing decode with packet view off. K28.5 searched with 7 occurrences.

File	Edit A	pplications	Utility Hel	o								_ (a x
Bus De	code Results										>	× Add Ne	w
Bus 1 (P	CIe)										68 Packets Decode	ed Cursors (Callout
Index	Start Time	Type (h)	SeqNum (h)	Length (h)	Routing (h)	Transactio	on Descriptor (h) Data (h)	Flow Credits (d)	CRC (h)	Phy (h)		
1	0s	COM									BC	Measure S	Search
2	2.004348ns	SKP									1C		
3	4.004348ns										1C -	Table	Plot
4	5.995652ns												
5	7.995652ns										50		More
6	9.995652ns		22C							4CBA	CO CO CE EC TO DAT	 Search 1	B1
7	21.99565ns											Bus: PCle	
8		Logical Idle										Search: Bus Events: 1	
9	27.99565ns	SDP									5C		
Wayofo	orm View					<u>[</u>]			_			-	
R 1 B1-PHY B1-PV		(28.5 COM	K28.0 SKP	K28.0 SKP	K28		K28.2	Data:(Dh Data:	225 -2.5 02h Data:2C SN:22Ch	0 V 0 V 5 V	
Ref 1 1.25 V/d 115 GS/s PCIE_GE	Bus 1 iv PCIe			2 3 4	Add	Add New Ref Bus		Horizo	ontal v 20 ns GS/s 20 ps/pt	Trigger	Acquisition	Analyze	eview

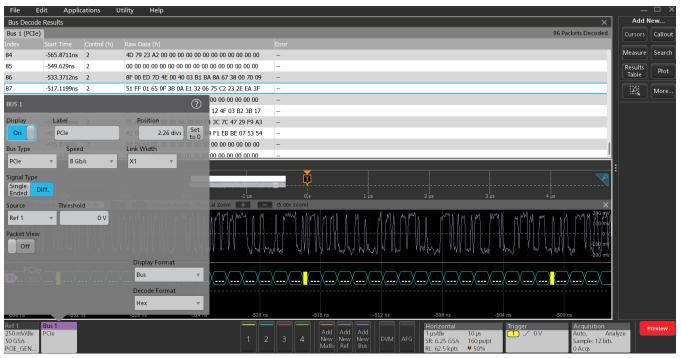
PCIe Gen 2 bus setup and MixedHex display, showing decode with packet view on. K28.5 searched with 1 occurrence.



PCIe Gen 2 bus setup and MixedHex display, showing decode with packet view off. K28.5 searched with 1 occurrence.

File Ec	lit Applic	ations Utili	ty Help				—	
Bus Decode	Results					x	Add N	lew
Bus 1 (PCIe)						31 Packets Decoded	Cursors	Callout
Index	Start Time	Framing Token	Type (h)	SeqNum (h)	Length (h)	Routing (h)		
5	-1.784374µs	STP	01	9A9	TLP Length:005 Length:001	Frame Parity:0 Address:16265C0C	Measure	Searc
5	-1.735629µs	STP	21	021	TLP Length:006 Length:008	Frame Parity:1 AddressHigh:304FB9ED AddressLow:3A3783F7	Results Table	Plot
,	-1.686887µs	STP	40	BA4	TLP Length:00D Length:008	Frame Parity:0 Address:08FC4C87		
:	-1.605625µs	STP	60	5FD	TLP Length:00E Length:008	Frame Parity:1 AddressHigh:FC999094 AddressLow:339EF92C		More.
Ð	-1.524384µs	STP	02	7BA	TLP Length:005 Length:001	Frame Parity:0 Address:18ADF33B		
LO	-1.47563µs	STP	42	FD2	TLP Length:006 Length:001	Frame Parity:1 Address:0761B1D7	Search 1 Bus: PCle	
11	-1.426876µs	STP	04	461	TLP Length:005 Length:001	Frame Parity:0 Bus Number:31 Device Number:1D Function Nur	Search: Bu Events: 2	s
H-PHY) D	4 us om Scale 4.0	-3 us 0 ns/div	-2 µ	x zoom) Verti	cal Zoom + (5.00x zoom)	2 μ5 3 μ5 4 μ5 750 mV × 1450 μ5 1452 μ5 1449 μ5 200 mV		
B1-PHY	Pole		() () () () () () () () () () () () () (
	Bus 1 PCle		1 2	3 4	Add Add Add New New New DVM AFG SR:	rizontal Trigger Acquisition 3/div 10 µs ↓ V Auto, Ane 6.25 GS/s 160 ps/pt 62.5 kpts ♥ 50% 0 Acqs	ilyze	Preview

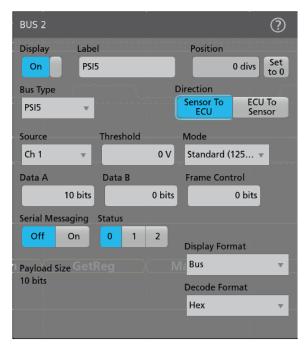
PCIe Gen 3 bus showing decode with packet view on. TLP packet of type I/O searched with 2 occurrences.



PCIe Gen 3 bus setup showing decode with packet view off.

PSI5 characteristics (Version 2.1)

PSI5 Sensor to ECU configuration



PSI5 ECU to Sensor configuration

BUS 2	?
Display Label On PSI5	Position 0 divs Set to 0
Bus Type PSI5 v	Direction Sensor To ECU Sensor
Source Threshold Ch 2	Sync Bit Period 0 V 60 µs
Sync Mode Data Format Pulse Tooth Width Gap Nibble Byte	e
	Display Format
	Decode Format

Bus setup options

Characteristi c	Description						
PSI5 Sources	Analog channels						
	Digital channels						
	Active Math channels						
	Active Reference channels						
Thresholds	Per-channel thresholds						
Recommende d Probing	Sensor to ECU	Current probe with minimum current rating of less than 50mA - TCP2020, TCP202A					
	ECU to Sensor	Differential Voltage probe - TDP1000, TDP1500, and TAP1500					
Direction	ECU to Sensor						
	Sensor to ECU						
Direction -	Mode	Slow (83.3 kbps)					
Sensor to ECU		Standard (125 kbps)					
		Fast (189 kbps)					
	Data A	10 - 24 bits					
	Data B	0 - 12 bits					
	Frame Control	0 - 4 bits					
	Status	0 - 3 bits					
Direction - ECU to	Sync Bit Period	1 us to 300 us					
Sensor	Sync Mode	Pulse Width					
		Tooth Gap					
	Data Format	Nibble					
		Byte					
Decode	Hex	1					
Format	Binary						
	Mixed Hex						

Display modes

Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous displays bus and digital waveforms
Results Table	Decoded packet data in a tabular view

Bus search options

Characteristic	Description			
Mark On	Direction - Sensor	Start [Start of packet]		
	to ECU	Status		
		Data [Region B and Region A]		
		Block ID		
		Sensor Status [5 different status]		
		Errors [Parity CRC and any]		
	Direction - ECU to Sensor	Start [Start of packet]		
		Status		
		Data [4 or 8 bits]		
		Function Code		
		Sensor Address		
		Register Address		
		CRC Error		
1		1		

Characteristic	Description	Description	
		Data B (Cyan Field) Data A (Cyan Field) Parity or CRC (Purple Field)	
	Direction - ECU to Sensor Packets	J Sensor Address (Yellow Field) Function Code (Yellow Field) Register Address (Yellow Field) Data (Cyan Field) CRC (Purple Field)	
Error Type		Parity CRC Response Code (Sensor to ECU)	

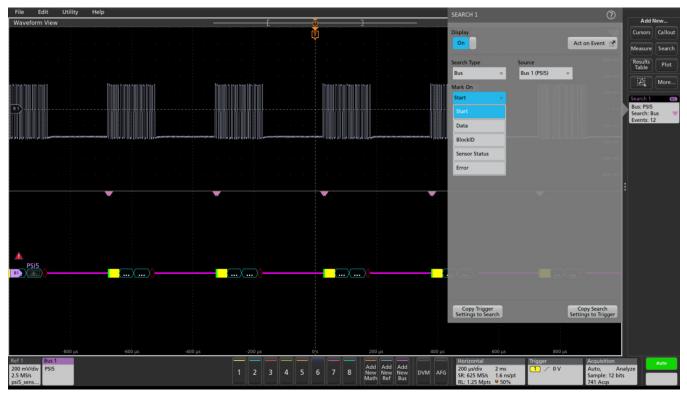


Note: Bus Search option is depend on the direction in Bus Configuration.

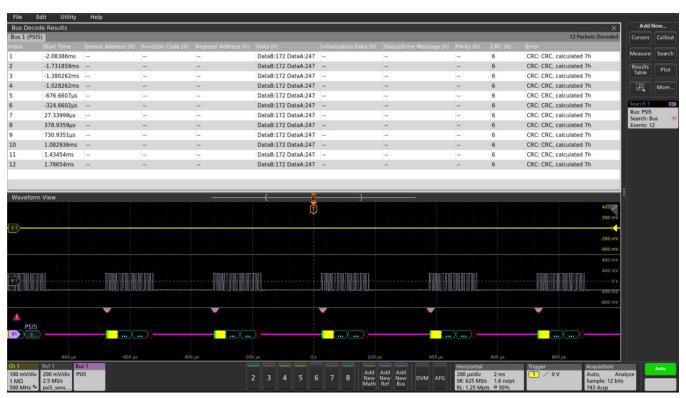
Bus decode

Description		
ensor to ECU ackets	Message Field (Yellow Field) Status (Yellow Field) Frame Control (Yellow Field)	
ir eı	rection - nsor to ECU ckets	

Table continued...



PSI5 Search configuration

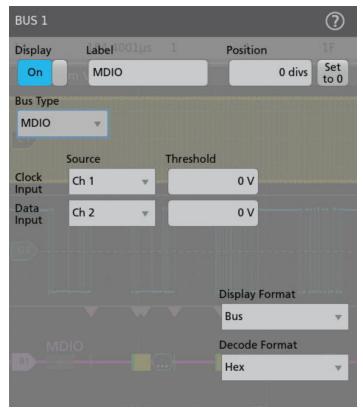


PSI5 Results table

MDIO Characteristics

Bus setup options

Characteristic	Description
MDIO Sources (Clock, Data)	Analog channels
	Digital channels
	Active Math channels
	Active Reference channels
Thresholds	Pre-channel thresholds
Recommended Probing	Single-ended
Formats Available	Hex
	Binary
	Mixed Hex



Bus configuration

Bus search options

Characteristic	Description	
Search On	Start Packet	
	OpCode	
	Physical Address	

Characteristic	Description
	Register Address
	Data
	Error: Any, OpCode Error, Device Type Error



Search configuration

Display modes

Characteristic	Description
Bus	Bus only
	Simultaneous display of bus and digital waveforms
Result Table	Decoded packet data in tabular view

Characteristic	Description	
Maximum Clock/Data Rate	Maximum frequency of up to 2.5 MHz	
Decode Display	Start Packet (Green)	
	Clause (Green)	
	OpCode (Yellow)	

Characteristic	Description		
	Physical Address (Yellow)		
	Register Address (Yellow)		
	Device Type (Yellow)		
	Data/Address (Cyan)		
	Error: Any, OpCode Error,		
	Device Type Error (Red)		



SVID characteristics (Version 1.9)

Bus setup options

Characteristic	Description	
SVID Sources (Clock, Data, Alert)	Analog channels	
	Digital channels	
	Active Math channels	
	Active Reference channels	
Thresholds	Pre-channel thresholds	
Recommended Probing	Single-ended	
Formats Available	Hex	
	Binary	
	Mixed Hex	

BUS 1					?
Display	10 Label			Position	
On	SVID			-2.06	divs Set to 0
Bus Type	2				
SVID					
	Source		Threshold		
Clock Input	Ref 1	Ŧ		500 mV	
Data Input	Ref 2			500 mV	
Alert Input	Ref 3			0 V	
				Display Form	at
				Bus	Ψ.
				Decode Form	at
				Hex	v
Carlos and a					

Bus configuration

Bus search options

Characteristic	Description
Search On	Start
	Slave Address
	Command
	Payload: Master, Slave, Either
	Errors: Any, Missing Ack, Parity
	End

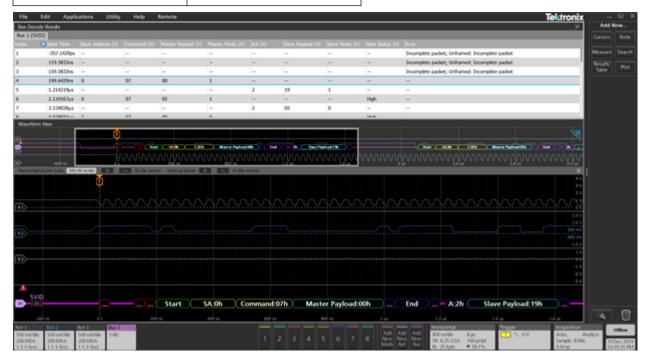


Search configuration

Display modes

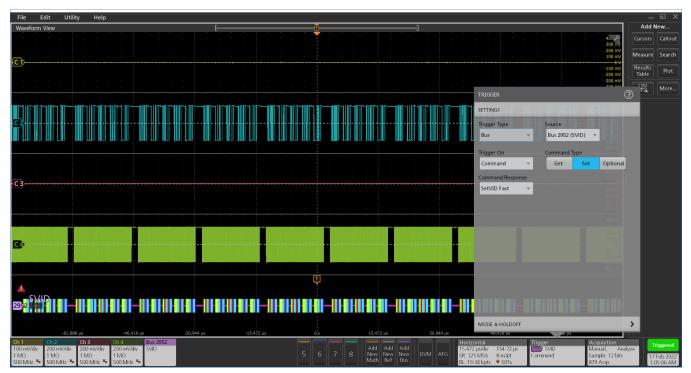
Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Result Table	Decoded packet data in tabular view

Description
Maximum frequency of 26.25 MHz
Start (Green)
Slave Address (Yellow)
Command (Yellow)
Master Payload (Cyan)
Master Parity (Purple)
End (Purple)
Turnaround (Purple)
Ack (Purple)
Slave Payload (Cyan)
Slave Parity (Purple)



SVID (Trigger) characteristics

Characteristic	Description	
SVID Sources	 Select the SVID bus on which to trigger. Trigger On select the type of information on which to trigger. 	
Trigger On	 Start Slave Address Command Payload Errors 	



Triggering on a specific SetVID Fast command on the SVID bus

e-USB2 (Version 2.0)

Bus setup options

Characteristic	Description
Source(s)	Analog channels
	Digital channels(single-ended)
	Active Math channels
	Active Reference channels
Thresholds	Pre-channel thresholds
Speeds	Speed High Speed (480 Mb/s)
	Full Speed (12 Mb/s)
	Low Speed (1.5 Mb/s)
Recommended Probing, HS, LS, and FS	Single-ended [Active Single Ended TAP1500]
Formats Available	Mixed Hex
	Hex
	Binary
	Mixed ASCII

? BUS 1 5 Display Label Position Set eUSB 0 divs On to O Bus Type Speed Mode eUSB Low (1.5 ... 🔻 Native Repeater w Source Threshold D+ Ch 1 οv Ŧ Input D-Ch 2 0 V w Input **Display Format** Bus v Decode Format Mixed Hex w

Bus configuration

Bus search options

Characteristic	Description
Search On	Characteristic Description
	Search On Sync
	Reset
	Suspend
	Resume/Wake
	Connect
	Control Message
	Port Reset
	Port Configuration
	Device Chirp
	Host Chirp
	End of Packet
	Token (address) Packet
	Data Packet
	Handshake Packet: ACK, NAK, STALL, NYET (HS only)
	Special Packet: PRE (FS only), ERR, SPLIT, PING
	Reserved
	Error: PID check, CRC5 or CRC16, Bit stuffing (LS and FS only)

SEARCH 1			?
Display On		Act on Eve	ent 🖪
Search Type	Source		-100104
Bus v	Bus 1 (eUSB)	v.	-200 mil
Mark On		and the	100
Control Message 📼			1
Sync			400 mV 300 mV
Handshake Packet			200 mV 100 mV
Error			-100 mV -200 mV
Token Packet			<u>-300 mV</u> -400 mV
Data Packet			400 mV
Reset			305 mV
Connect			105 mV
Control Message			0 V -100 mV
Suspend			-200 mV
Device Chirp			- 300 mV -400 mV
Host Chirp			
Port Reset			
Port Configuration			
Resume/Wake		Copy Set Settings to	arch Trigger
End of Packet			

Search configuration

Bus decode

Characteristic	Description
Decode Display	Start of packet (green bar)
	Sync (green packet)
	PID (yellow packet)
	Token (address) (yellow packet)

Characteristic	Description
	Data (cyan packet)
	CRC (purple packet)
	Error (red packet)
	End of packet (red bar)
	Control Message (Yellow packet)
	Zeros (Blue packet)
	Ack (Purple packet)
	Port Reset (Red Bar)
	Port Configuration(Green Bar)
	Connect (Green Bar)
	Resume/Wake(Green Bar)
	Device Chirp(Green Bar)
	Host Chirp (Green Bar)
	End Of reset(Red Bar)

Results & other features

Characteristic	Description
Table view	View more than 10000* points
* Depends on the Model	
Save	Save Result table as CSV
Sessions	Save sessions of your protocol setup
Simultaneous Buses	Load multiple Buses simultaneously*
* Depends on the Model	
Upcoming Future addition	Timing Measurements for Protocols
Search Table	Displays the Search hits along with Delta time difference between hits

Bus Deco	de Results											Add New
Bus 1 (eUS REPEAT		2 (eUSB- IPHERA									96 Packets Decode	ed Cursors Callo
ndex (A Start Time											CR Measure Sear
1	-99.08332µs	DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	
2	-98.67706µs	DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F Table Plo
3	-98.27081µs	DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F More
4	-97.86456µs	DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F More
5	-97.45831µs	DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F
6	-97.05206µs	DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F
7	-96.6458µs	DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F
8	-96.23956µs	DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F
9	-95.8333µs	DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F
10	-95.42707µs	DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F
11	-94.84372µs											-
12	-85.92705µs											
13	171.2468µs	DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F
Horizontal Z	toom Scale 7.00	us/div + - (32.00x zoom) \	44Ubs /ertical Zoom	(1.00x zoor		light for the second s	1.120 r ill	↓ III 1,344 ms I	II II.568 ms	1179 Illus II	×
	USJ&@STST B-HOST-REPE#					SYN PID:DA Data:1	TA0 8h					€
B1 +	686 µs	693	μs	700 µs	707 µs		714 µs	0 1 µs		735 µs	742 µs	
	NGUBEPERIPERET	∜AL										-
eUSI B2 +	B-PERPIPHERA	L-REPEATER		Resu	me/Wake							
1 MΩ	Ch 2 200 mV/div 1 MΩ 500 MHz ^B	1 MΩ	Ch 4 iv 200 mV/div 1 MΩ 8w 500 MHz 8w					Add New Math Re	dd Add ew New AFG	Horizontal 224 µs/div 2.24 m SR: 3.125 GS/s 320 ps RL: 7 Mpts 7 10%	/pt Sample: 12	Analyze

Results table with decoded waveform

Manchester Characteristics (Line encoding)

Bus setup options

Characteristic	Description
Manchester Sources	Analog channels Digital channels(single-ended) Active Math channels Active Reference channels
Bus Setup: Threshold Idle Bits Transition For '0' Tolerance	BUS 1 Display Label Position On Manchester O divs Set 10 divs Set 0 divs Set 125 kb/s Source Threshold View Packet View Off 1 V 12 bits 10% Display Format Bus V Decode Format Hex V
Recommended Probing	Differential/Single ended
Formats Available	Hex Binary
Packet View	BUS 1 ? Display Label Position On Manchester 0 divs Set to 0 Bus Type Transition For '0' Data Rate Manchester 125 kb/s Source 125 kb/s Source Threshold Packet View Idle Bits On 1.2 bits 10% Sync Bits Parity Bit Order 1 bits None Odd Even Mord Count Word Size Display Format 1 8 bits Bus v Header Trailer O bits Verter

Bus search options

Characteristic	Description
Search On	Characteristic Description

Characteristic	Description
	Search On Sync
	Reset
	Suspend
	Resume/Wake
	Connect
	Control Message
	Port Reset
	Port Configuration
	Device Chirp
	Host Chirp
	End of Packet
	Token (address) Packet
	Data Packet
	Handshake Packet: ACK, NAK, STALL, NYET (HS only)
	Special Packet: PRE (FS only), ERR, SPLIT, PING
	Reserved
	Error: PID check, CRC5 or CRC16, Bit stuffing (LS and FS only)

Display modes

Characteristic	Description
Bus	Bus Only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Results Table	Decoded packet data in a tabular view with columns containing:
	Sync Pattern
	Packet Header
	Packet Data
	Packet Trailer
	Error

Bus decode

Characteristic	Description
Maximum Clock/Data Rate	1Gbps
Table continued	

Characteristic	Description
Decode Display	Control Field (yellow packet)
	Payload Field (cyan packet)
Error Handling	Parity
	Manchester
Search On	When Packet View is ON
	Sync Bits
	Header
	Data
	Trailer
	Errors
	When Packet View is OFF
	Data
	Errors

Results & other features

Characteristic	Description
Table view	View more than 10000* points
* Depends on the Model	
Save	Save Result table as CSV
Results Table	Sessions
Simultaneous Buses	Load multiple Buses simultaneously*
* Depends on the Model	
Upcoming Future addition	Timing Measurements for Protocols
Search Table	Displays the Search hits along with Delta time difference between hits

Bus search options

Characteri stic	Description	
Search On (Packet View ON)	Sync Bits Header Data Trailer Errors	Mark On Sync Bits Sync Bits Header Data Trailer Errors
Search On (Packet View OFF)	Data Errors	Mark On Data Data Errors Laca

DPHY(DSI2.0/CSI2.0) Characteristics (Version 2.0)

Bus setup options

Characteristic	Description
DPHY Sources	Analog channels
	Math channels
	Active Reference channels
Salient Features	Decode capability in for CSI/DSI protocols.
	Decode capability for Escape mode.
	Decode capability for High speed burst mode.
	Decode capability for 8b9b line encoding in LPDT and HS mode.
	Search capability for SoT/EoT
	Search capability for long and short packets
	Search capability for Escape mode
	Search capability for Errors like ECC, CRC, and Any
Bus Setup	BUS 1
Recommended Probing	Clock – Single Ended/Differential
	Data – Single Ended
	Single ended probe: No. of probes: 3 (D+ and D- by default)
	Differential probe: No. of probes: Not supported
8b9b encoding mode	Select line encoding in LPDT and HS mode.
Formats Available	Hex
	Binary
	Mixed Hex
L	

Display modes

Characteristic	Description
Bus	Bus Only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Result Table	Decoded packet data in a tabular view with columns containing:
	Mode
	Data Type
	Virtual Identifier
	ECC
	Data
	CRC
	End
	Error

Bus decode

Characteristic	Description
Maximum Clock/Data Rate	2.5 Gbps
Decode Display	Control Field (yellow)
	ECC/CRC (Green)
	Pixel Fields (Red,Green,Blue,Yellow)
	Data Symbol (cyan)
	Raw Fields (Cyan)
Error Handling	ECC
	CRC
	SOT Sync

Bus search options

Characteristic	Description
Search On (CSI/DSI)	SoT – It searches SoT of each transmission in HS mode
	EoT – It searches EoT of each transmission in HS mode.
	Data – Data search (HS/LP)
	Scrambling – Search for scrambling mode command
	Compression – Search for Compression mode command.
	**Packets – Searches for Short and long packets
	Escape – Search for Escape entry mode
	STOP – Search for Escape mode exit
	Errors – Search for CRC and ECC errors.
	**Can select from the list of standard packet names

Result & other features

Characteristic	Description
Table view	View more than 10000* points
* Depends on the Model	
Save	Save Result table as CSV
Sessions	Save sessions of your protocol setup
Simultaneous Buses	Load multiple Buses simultaneously*
* Depends on the Model	
Upcoming Future addition	Timing Measurements for Protocols
Search Table	Displays the Search hits along with Delta time difference between hits

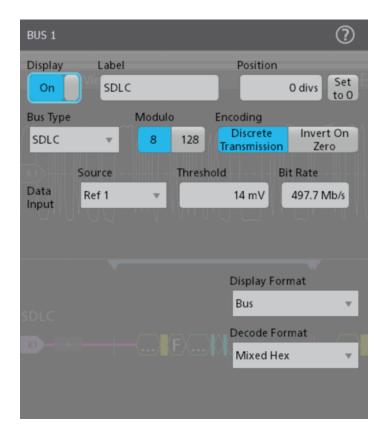
						_			
S	EARCH 1								(?)
F									
L	Visplay								
	On						Ac	t on l	Event 🛃
	plete packet(2); Unfrar earch Type								
S	earch Type	_	Sourc	ce				_	
l	Bus 💌		Bus	1 (DF	νΗΥ)			•	
N	1ark On								
	SoT 👻								
	EoT								
m	Data	hed:							
	Scrambling								
	Compression								
	Packets								
	BusTurnAround								
-	BusturnAround								
	Escape								
	Stop								
	Errors								
									0V

Bus search options

SDLC Characteristics (Version GA27-3093-3)

Bus setup options

Characteristic	Description
SDLC Source(s)	Analog channels
	Digital channels
	Active Math channels
	Active Reference channels
Thresholds	Pre-channel thresholds
Recommended Probing	Differential
Modulo	8 [8-bit Control Word]
	128 [16-bit Control Word]
Encoding	Discrete Transmission [NRZ] Invert On Zero [Inverted NRZi]
Formats Available	Hex
	Binary
	Mixed Hex



Display modes

Characteristic	Description
Bus	Bus Only
Result Table	Decoded packet data in a tabular view

Bus decode

Characteristic	Description
Maximum Clock/Data Rate	1 Gbits/sec
Decode Display	Start (green vertical line)
	Address (yellow field)
	Frame Type (yellow field)
	Code (yellow field)
	Ns(yellow field) [Sequence number sent]
	Nr(yellow field) [Sequence number received]
	Poll/Final (yellow field)
	Data(cyan field)
	FCS(purple field)
	Abort (red vertical line)
Error handling	FCS [Frame Check Sequence Errors]

Bus search options

Characteristic	Description	Dis
Search On	Start [Searches for Start event]	
	Data [Searches for Payload Data]	Sea
	Abort [Searches for Abort]	Bu
	Address	Ma
	Broadcast [Broadcast Packets]	S
	No Station [Packets not pertaining to secondary]	
	Station [Valid Station Address]	
	Unnumbered	
	Commands [Searches for Primary	
	Commands]	s
	Responses [Searches for Secondary Responses]	E
	Both Information [Searches for information frames]	
	Supervisory [Searches for different receiver status]	
	Receive Frame Ready	
	Receive Frame Not Ready	Bus
	Reject frame	240
	Errors	
	FCS [Searches for Frame Check Sequence errorrs]	
	Out of Numeric Order [Searches for this frame]	
	Stop	





The Protocol Decode Results Table provides a time-stamped, tabular view of all captured packets on the SDLC bus.



Searching on a station address on the SDLC bus.

CPHY Characteristics (Version 2.0)

Bus setup options

Characteristic	Description
CPHY Sources	Analog channels
	Digital channels
	Math channels
	Active reference channels
Salient Features	Decode capability in for CSI/DSI protocols. Decode capability for Escape mode.
	Decode capability for High speed burst mode.
	Decode capability for Word/Symbol Mode.
	Decode capability in single ended and differential mode
	Search capability for SoT/EoT
	Search capability for long and short packets Search capability for Escape mode
	Search capability for CRC Errors
	Search capability on Pixel value and Pixel number in CSI/DSI packet search
Sub Type	CSI
	DSI
	Word (16 Bit data word decode)
	Symbol (Symbol level decode of cphy data)
Signal Type	Single Ended: No. of probes: 3
	Differential: No. of probes: 5
	Minimum BW of probe: As minimum bitrate of HS is set to 4 Mbps, almost all probe should work. But considering the general CPHY HS speed is about 1 GHz and speed can vary depending on customer, the probe need to based on what speed the end customer want to test.
Formats Available	Hex
	Binary
	Mixed Hex

Display modes

Characteristic	Description
Bus	Bus Only
Result Table	Decoded packet data in a tabular view with columns containing:
	Mode Data Type
	Virtual Identifier
	PHCCRC
	Data CRC
	Symbols
	End
	Error

Bus decode

Characteristic	Description				
Maximum Clock/Data Rate	10 Gbps				
Decode Display	Control Field (yellow) ECC/CRC (Green)				
	Pixel Fields (Red, Green, Blue, Yellow)				
	Data Symbol (cyan) Raw Fields (Cyan)				
	Word and Symbol Decode (cyan)				
Error Handling	PHCRC				
	CRC				
	SOT Sync				
Sub type	CSI (CSI packet decode)				
	DSI (DSI packet decode in HS/LP)				
	Word (16 bit word decode)				
	Symbol Decode				

Bus search options

Characteristic	Description
Search On (CSI/DSI)	SoT – Searches SoT of each transmission in HS mode
	EoT – Searches EoT of each transmission in HS mode.
	Data – Data search (HS/LP)
	Scrambling – Search for scrambling mode command
	Compression – Search for Compression mode command.

Characteristic	Description
	**Packets – Searches for Short and long packets Escape – Search for Escape entry mode
	Errors – Search for CRC and PHCRC errors.
	**Can select from the list of standard packet names
Word / Symbols Decode	Search for Words/Symbols respectively



The protocol decode results table provides a time-stamped, tabular view of all captured pixel packets on the CPHY bus

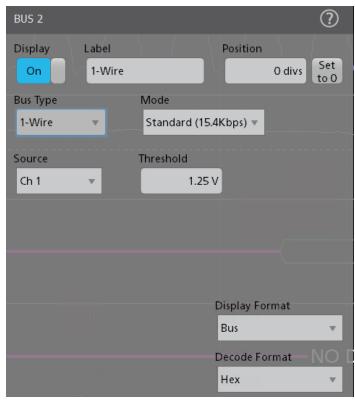


CPHY search results display

ONEWIRE Characteristics

Bus setup options

Characteristic	Description
1-WIRE Sources	Analog channels
	Digital Channels
	Active Math channels
	Active Reference channels
Salient Features	Decode capability in for 1-WIRE protocol.
	Decode capability for Standard mode.
	Decode capability for Overdrive mode.
	Search capability for Reset, Presence events
	Search capability for Command, Data
	Search capability for different ROM packets such as Read/Match/Skip/Search ROM and Alarm based on the Standard or Overdrive mode chosen.
	Search capability for CRC Error
Formats Available	Hex
	Binary
	Mixed Hex
Mode	Specifies the mode of operation – Standard (15.4 kbits/s) or Overdrive (125 kbits/s).
Recommended Probing	Single Ended passive probe
	Differential passive probe



Bus setup

Display modes

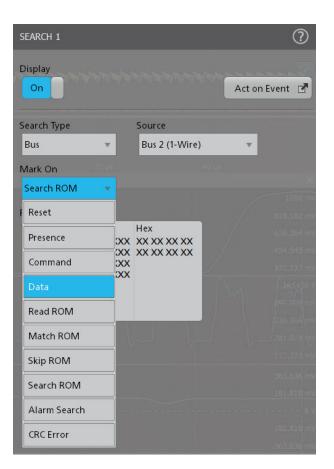
Characteristic	Description		
Bus	Bus Only		
Result Table	Bus Only Decoded packet data in a tabular view with columns containing: Initialization ROM Command ROM Code CRC Command Data		
	Initialization		
	ROM Command		
	ROM Code		
	CRC		
	Command		
	Data		
	Error		

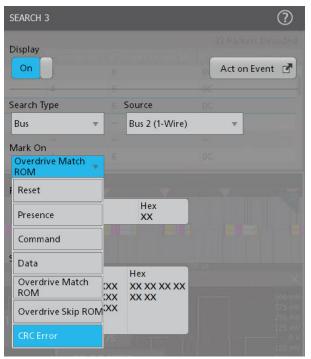
Bus decode

Characteristic	Description
Decode Display	ROM Command/ROM Code/ Command (yellow) CRC (purple) Reset/Presence event (Green) End event (Red)
Error Handling	CRC

Bus search options

Characteristic	Description
Search On 1-WIRE	Reset – Searches for the Reset event. Reset is the default trigger on condition.
	Presence – Searches for the Presence event.
	Command – Searches for Command.
	Data – Searches for the Data.
	Read ROM – Searches for the Family code and Serial number of Read ROM.
	Match ROM – Searches for the Family code and Serial number of Match ROM.
	Overdrive Match ROM – Searches for the Family code and Serial number of Match ROM.
	Skip ROM – Searches for Skip ROM packet.
	Overdrive Skip ROM – Searches for the Overdrive Skip ROM packet.
	Search ROM – Searches for the ROM code.
	Alarm Search – Searches for the Alarm packet.
	CRC Error specifies the search condition as CRC Error.





Search on 1-WIRE

File Ec	it Applic	ations Utility	Help Debug							_	ωx
Bus Decode	Results								×	Add I	New
Bus 1 (1-Wire)								46 Packets Decoded	Cursors	Callout
Index											
1	-1.291216ms	Reset:-1.291216ms								Measure	Search
2	-775.2975µs	Presence:-775.2975µs	Search ROM	ROM Code:3400000054A73910						Results	Plot
3	15.0041ms	Reset:15.0041ms								Table	
4	15.52066ms	Presence:15.52066ms	Match ROM	Family Code:10 Serial Number:00000054A739	2C	44					More
5	1.022878s	Reset:1.022878s									
6	1.023387s	Presence:1.023387s	Match ROM	Family Code:10 Serial Number:00000054A739	2C	BE	2D 00 E8 80 FF FF 18 54 8E			Search 1	69
7	1.060963s	Reset:1.060963s								Bus: 1-Wir Search: Br	
8	1.061473s	Presence:1.061473s	Search ROM	ROM Code:CE0000045CFFBD28						Events: 15	
9	1.108843s	Reset:1.108843s									
10	1.109358s	Presence:1.109358s	Match ROM	Family Code:28 Serial Number:0000045CFFBD	73	44					
11	2.11666s	Reset:2.11666s									
12	2.11717s	Presence:2.11717s	Match ROM	Family Code:28 Serial Number:0000045CFFBD	73	BE	78 01 4B 46 7F FF 08 10 51				
13	2.426812s	Reset:2.426812s									
14	2.427328s	Presence:2.427328s	Search ROM	ROM Code:3400000054A73910							
Waveform V	iew									1:	
					ă						
B					ROP	4 Code: 340000005	4A73910h	¹¹ +			
	-40 ms	-30 n		-20 ms -10 ms			10 ms 20 ms	30 ms	40 ms		
Horizontal Zo	om Scale 400.0		(25.00x zoom) Vert		414				×		
				a a a a a a a a a	· ·			a a second a second	6.25 V		
				יות היה הייתה היה הית היות הי	יון ווי	<u> </u>			5,v 3.75 v 2.50 v		
									2.50 V		
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									-1.25 V -2.50 V		
1-W	re			Family Code:10h			Carriel Normale	er:00000054A739	-		
B1 +			latch ROM	Family Code: Ion			Serial Numbe	er.00000054A739r			
			16.4 ms							_	
Ref 1	Bus 1							Horizontal	Trigger Acquisition		Preview
2 V/div	1-Wire			1 2 3 4		7 8 Ne		10 ms/div 100 ms	 ✓ 0 V Auto, A 	.nalyze 📃 💻	
1 MS/s 1-wire_10							th Ref Bus	SR: 12.5 MS/s 80 ns/pt RL: 1.25 Mpts 9 50%	Sample: 12 bi 0 Acqs	10	Feb 2021 :53:58 AM

File Ed	lit Applic	ations Utility	Help Debug					SEARCH 1		?	_ 🖬 X
Bus Decode	Results										Add New
Bus 1 (1-Wire)							Display		46 Packets Decoded	Cursors Callout
Index	Start Time	Initialization	ROM Command (h)	ROM Code (h)	CRC (h)	Command (h)	Data (h)	On		Act on Event	
1	-1.291216ms	Reset:-1.291216ms									Measure Search
2	-775.2975µs	Presence:-775.2975µs	Search ROM	ROM Code:3400000054A73910			-	Search Type	Source		Results Plot
3	15.0041ms	Reset:15.0041ms						Bus	Bus 1 (1-Wire)		
4	15.52066ms	Presence:15.52066ms	Match ROM	Family Code:10 Serial Number:00000054A739	2C	44		Bus	Bus I (I winc)		More
5	1.022878s	Reset:1.022878s						-Mark On			
6	1.023387s	Presence:1.023387s	Match ROM	Family Code:10 Serial Number:00000054A739	2C	BE	2D 00 E8 80 FF FF 18 54 8E	Match ROM 🛛 👻			Search 1 🚯
7	1.060963s	Reset:1.060963s						Family Code			Bus: 1-Wire Search: Bus
8	1.061473s	Presence:1.061473s	Search ROM	ROM Code:CE0000045CFFBD28			-	Binary	Hex		Events: 15
9	1.108843s	Reset:1.108843s		-	-			- XXXX XXXX	xx		
10	1.109358s	Presence:1.109358s	Match ROM	Family Code:28 Serial Number:0000045CFFBD	73	44	-				
11	2.11666s	Reset:2.11666s						Serial Number			
12	2.11717s	Presence:2.11717s	Match ROM	Family Code:28 Serial Number:0000045CFFBD	73	BE	78 01 4B 46 7F FF 08 10 51	Binary	Hex		
13	2.426812s	Reset:2.426812s						XXXX XXXX XXXX XXXX	XX XX XX XX		
14	2.427328s	Presence:2.427328s	Search ROM	ROM Code:3400000054A73910				XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXX			
Waveform V	'iew										
	~										
B					ROP	4 Code:340000005	4A73910h	<mark>-</mark>			
	-40 ms	-30 n		-20 ms -10 ms			10 ms 20 ms	30 ms		115	
Horizontal Zo	om Scale 400.0	00 us/div 🛛 🕂 🖳 —	(25.00x zoom) Vert							×	
										6.25 V	
	moto			יא היה היה היידה היה או הייד	<u> </u>	, (,) (3.75 V	
										2.50 V	
R 1			لا - استال - استوال -	- land-aadaadhaadhaadhaadhaadhaadhaadhaadha	Incolling II -	_ ا ا ا		baraldbarad kasarddbarar			
										1.25 V 2.50 V	
										3.75 V	
								Copy Trigger		Copy Search	
1-Wi	re		Aatch ROM	Family Code:10h			Carial Number	Settings to Search	an la	Settings to Trigger	
B1 +		N	Aalten ROM				Serial Numbe	en.00000054A7.	sen		
										19.2 ms	
Ref 1	Bus 1							Horizontal	Trigger	Acquisition	Preview
	1-Wire			1 2 3 4			dd Add Add w New New DVM AFG	10 ms/div 100 ms	<u> </u>	Auto, Ana	lyze
1 MS/s 1-wire_10							ith Ref Bus	SR: 12.5 MS/s 80 ns/pt RL: 1.25 Mpts 9 50%		Sample: 12 bits 0 Acqs	10 Feb 2021 12:55:28 AM

Searching on a MATCH ROM packet with Family Code and Serial Number on the 1-WIRE bus.

The protocol decode results table provides a time-stamped, tabular view of all captured pixel packets on the 1-WIRE bus.

CXPI characteristics (Version: JASO D 015-3: 2014/J3076_201510)

Bus setup options

Characteristic	Description
CXPI sources (signal source)	 Analog channels- 1 Active Reference channels- 1 Digital channels Math channels
Recommended Probes	It is a low speed protocol with voltage between 1.8 V-3.3 V • Active Probes P7240 • TPP1500 • Low Voltage Single Ended Probes
Product differentiator	Display IBS bits on decoded bus for Inter byte spacing clarity.
Salient features	CXPI source has recessive threshold level for signal decode. i.e. TH(rec) is 70% peak-to-peak of the signal. Transmitting node transmits data to the
	communication bus, it transmits to encoding circuit after converting the data to UART format.
Formats available	Hex
	Binary
	Mixed Hex
Bit rate	Specifies the data rate up to 20 kbs for CXPI bus decode.

Description

Start Frame type

Frame ID

PTYPE ID

Sleep

Decoded packet data in a tabular view

with columns containing:

Bus only

•

•

.

•

•

Characteristic	Description
Result table	Wakeup
	Counter
	• DLC
	EXTDLC
	• Data
	Frame Parity
	Ptype parity
	• CRC
	Errors

Bus decode

Characteristic	Description
Maximum Clock/Data Rate	20 kbs
Decode Display	 IFS (start event-vertical), Start bit and stop bit (Green) Frame ID (Yellow) IBS: (Dark blue) Data, Counter, wakeup, sleep, DLC, and EXTDLC (cyan) Parity and CRC (Purple)
Error Handling	 CRC Parity IBS Frame error

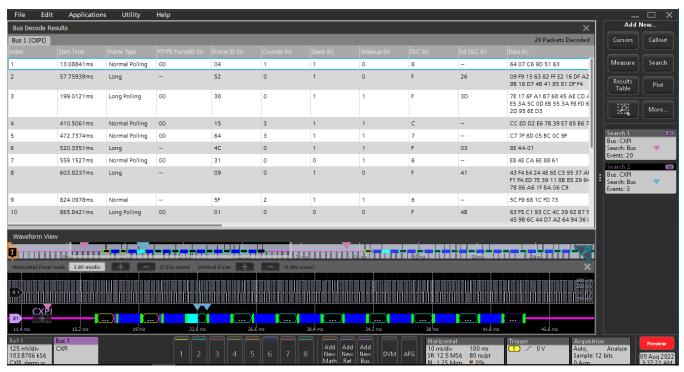
Bus search options

Characteristic	Description
Search On	Start
	• Frame
	Frame ID
	• PTYPE
	• DLC
	ExtDLC
	Network management: Wakeup and sleep
	Counter
	• Data
	Errors: Parity, CRC, IBS, Frame.

Display modes Characteristic

Bus

Result table



The Protocol Decode Results Table provides a time-stamped, tabular view of all captured packets with frame type along with supported errors on the CXPI bus.



Searching on a DLC field in packets with value 6(110) on the CXPI bus.

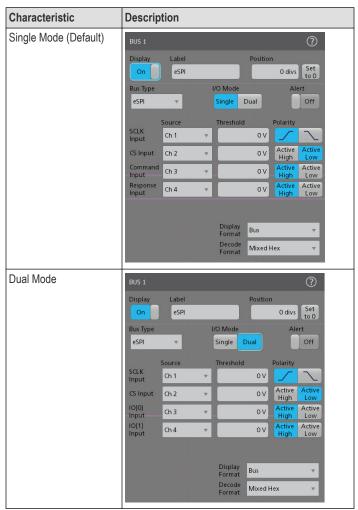
Enhanced serial peripheral interface (eSPI) characteristics (Version 1.0)

Bus setup options

Characteristic	Description
eSPI Sources	 Analog channels Digital Channels Active Math channels Active Reference channels
Salient features	 Decode capability for eSPI protocol. Decode capability for Single I/O mode with Alert as optional. Decode capability for Dual I/O mode with Alert as optional. Search capability for Start and End events Search capability for Status and Wait state Search capability for different channels: Channel Independent, Peripheral, OOB, Virtual Wire, and Flash Access based on command or response phase. Further, search capability for Command phase based on different channel related command opcodes and Response phase based on with/ without header. Both phases support sub field search based on corresponding cycle type.
	Search capability for Errors based on the phase: CRC/Cycle type/Command opcode/Defer/ Fatal/Non-Fatal/No Response.
Formats Available	Hex Binary Mixed Hex
I/O Mode	Specifies the mode of operation: Single mode (CMD and RSP on different lanes) Dual Mode (CMD and RSP on same lane)
Alert	Optional Alert channel- off by default
Polarity	Specifies the polarity of the input sources
Channels required for decode	4+1 (Clock, Chip Select, Command Input, Response Input + Alert)
Recommended Probes	It is a low speed protocol with voltage between 1.8 V-3.3 V 1. Active Probes P7240
Table continued	

Characteristic	Description
	 TPP1500 Low Voltage Single Ended Probes
Differentiators	 Protocol Search options (additional search options available under protocol decode):
	Start and End EventsWait StatesData
	 Errors – Invalid command type, Invalid cycle type, Fatal/Non-Fatal Errors. Decode formats in MIXED HEX.

Bus setup



Display modes

Characteristic	Description
Bus	Bus only
Table continued	

Characteristic	Description
Result Table	Decoded packet data in a tabular view with columns containing:
	Command OpCode
	Cycle Type
	Header
	Address
	• Data
	Response
	Status
	• CRC
	Error
	• PEC

Bus decode

Characteristic	Description
Decode Display	Start (Green)
	Command OpCode, Response, Virtual Wire Count/Group/Index, Cycle Type, Tag, Length, Message Code, SMBus Slave address/Source address/Destination address/Source slave address/ OpCode, Byte Count, MCTP, Destination Point, Source Point, SOM, EOM, PEC, Latency Scale, Message Tag, TO, PktSeq, Wait (Yellow)
	Data, Double Word, Virtual Wire Data (Cyan)
	CRC (Purple)
	Stop, Response error, Unframed (Red)
Error Handling	CRC, Defer, Fatal, Non-Fatal, No Response, Command OpCode, Cycle type

Bus search options

Characteristic	Description
Search On eSPI	Start: Enables to search the start event of the packet decode.
	Channel Independent : Enables search on Channel Independent command and responses packets.
Search On eSPI	Peripheral Channel : Enables search on different types of Peripheral channel command and responses packets.
	OOB Channel : Enables search on different Out-Of- Band (OOB) channel command and Responses packets.
Table continued	1

Characteristic	Description
	Virtual Wire Channel: Enables search on different Virtual Wire channel command and responses packets.
	Flash Access Channel: Enables search on different Flash access channel command and responses packets.
	Wait: Enables to search on the wait state that appears after the TAR window.
	End: Enables to search on the End events when the packet decode ends.
	Phase : Select the type of phase between command and response for which to search.
	Command : Enables search on the command opcode of different channels specified under the mark on.
	Response : Enables to search on the response field.
	Response With Header : Enables to search on the RSP opcode that consists of a Response Code and a Response Modifier.
	Response Without Header : Enables to search on the RSP opcode that consists of a Response Code and a Response Modifier.
	Command Opcode : Enables search on the command opcode of different channels.
	Cycle Type : Enables search under command and response with header based on different cycle types for different channels.
	Address: Enables search on the address field for different channels based on different commands and response with header classified based on cycle types.
	Tag : Enables search on the tag field for different channels based on different commands and response with header classified based on cycle types.
Table continued	1

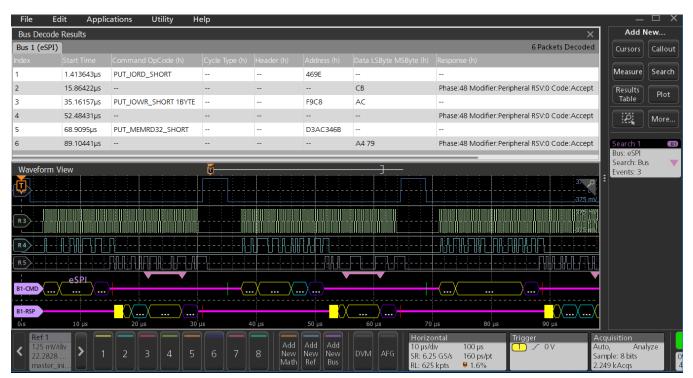
Characteristic	Description
Search On eSPI	Length: Enables search on the length field for different channels based on different commands and response with header classified based on cycle types.
	SMBus Slave Address: Enables search on SMBus Slave address under the OOB channel.
	Virtual Wire Count: Enables search on Virtual Wire Count for command and response with header under the virtual wire channel.
	Virtual Wire Index: Enables search on Virtual Wire index for command and response with header under the virtual wire channel.
	Virtual Wire Data: Enables search on Virtual Wire Data for command and response with header under the virtual wire channel.
	Data Bytes : Sets the number of data bytes for which to search.
	Data : Sets the data value for which to search. Searches based on command and response.
	Status: Enables search on the status field of the response packets.
	Error Type : Sets the error type for which to search based on command or response phase.
Mark On and Channel Independent	SEARCH 2 Display On Act on Event C Search Type Source Bus Source Bus Bus 1 (eSP) Mark On Start Channel Independent Peripheral Channel OOB Channel Virtual Wire Channel Flash Access Channel Data Status



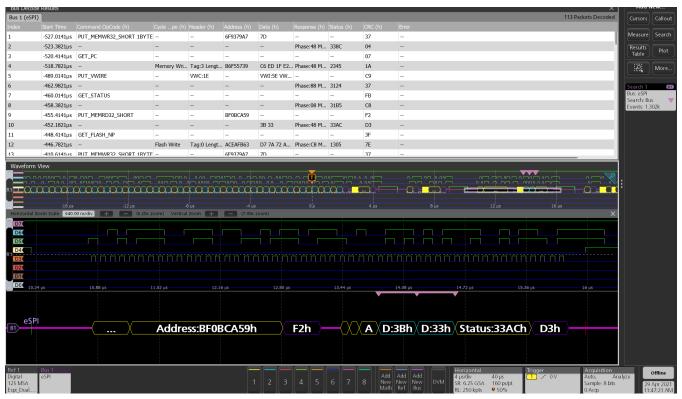
Table continued...

Characteristic	Description	Characte
Characteristic Mark On and Channel Independent	SEARCH 2 ? Display On Act on Event ? Search Type Source Bus 1 (eSPI) Mark On OOB Channel Phase Command Response Binary Hex XXXX XXXX XXXX SMBus Slave Binary Address XXXX XXXX XXXX SEARCH 2 ? Display On Act on Event ? Search Type Source Bus 1 (eSPI) Wark On Virtual Wire Channel Phase Command Response With Response Without Header Without Header Virtual Wire Channel Phase Command Response With Header Without Header PUT_WURE York With Without Header	Mark On a Independe
	Virtual Wire Binary Hex Index XXXX XXXX XX Virtual Wire Binary Hex Data XXXXX XXXX XX	

haracteristic	Description
	SEARCH 2 Display On Search Type Bus Bus 1 (eSPI) Mark On Virtual Wire Channel Peripheral, OOB, and Virtual Wire Channel
ark On and Channel dependent	SEARCH 2 Display On Act on Event C Bus On Act on Event C Bus On Bus 1 (eSPI) Mark On Flash Access Channel Bus 1 (eSPI) Mark On Flash Access Channel Completion Header Cycle Type PUT_FLASH_C C Successful Completion Tag Sinary Without Data Binary Without Data



The Protocol Decode Results Table provides a time-stamped, tabular view of all captured pixel packets on the eSPI bus. (Single I/O Mode)



The Protocol Decode Results Table provides a time-stamped, tabular view of all captured pixel packets on the eSPI bus. (Dual I/O Mode)

Bus Decode	Results										>	Add New
Bus 6650 (eS	PI)										161 Packets Decode	d Cursors Calle
							ddress "					
37	-91.31329µ5 -88.13188µs GET_PC	message i	With Data	rag.1 Lengui.00A Messaç	gecoue.on message opecine i	36_PI36.201L/73A		SEARCH 1			?	Measure Sear
38	-87.76182µs	 Memory V	Vito 64	Fag:0 Length:018				Display				Results Plo
39	-82.6694µs GET_PC	Memory v		ag:0 Lengui:018		0	002//	On			Act on Event	Table Pic
10	-82.29928µs	 Memory V		- Fag:A Length:018				Search Type		2ESource 08 35 B7 I		Mor
10 11	-76.71867µs PUT_NP	Memory R		Fag:1 Length:00D			4F7B70		21.			
12	-75.49406µs			Fag:6 Length:00D		U		Bus	¥ -	Bus 6650 (eSPI)		Search 1
13	-72.72088µs PUT NP	Memory R	-	Fag:D Length:007			- 32CF(Mark On				Bus: eSPI Search: Bus
13	-72.72088µs POT_NP			Fag:4 Length:007			_	Peripheral Chan	nel 🔻			Events: 2
4 r				- Lengun:007			_	Phase	рD			
15	-68.23504µs GET_NP -67.86505µs	 Memory R					CAD3D		Response V	/ith Response		
16 17	-67.86505µs -65.94633µs GET_NP	memory R	ledu 52	Fag:C Length:009			_	Command	Header	Without Hea		
10				- Eagl2 Longth:001			02705	Command Opcod	de	Cycle Type		
18 19	-65.57631µs -62.92507µs PUT_PC	Memory R		Fag:2 Length:001		1	_	PUT_NP	T	Memory Read 6	4 👻	
i0		Successful		Fag:D Length:008					89	-B-13 00 00 31 10.		
1	-61.21235µs	-	-						Binary XXXX	Hex X		
				(1.00x zoom)		2 μ 2			XXXX XXXX X XXXX XXXX X			
					67.5 x (771) x (772) x x x 210 x x x 210		-		XXXX XXXX X XXXX XXXX X XXXX			
	eSPI											
6650-CMD			Address:D	32CF0063489	99EE1h 🕮)		Щ					
36650-RSP	h	<u>aadi kaali</u> ka kuu ka		ويتباريه ويتدر	uluinin a lue			Copy Trigge Settings to Sea		s a construction of the second s	Copy Search ettings to Trigger	<u>N</u>
-73.2 µs	-72.8 µs	-72.4 µs	-72 µs	-71.6 µs	-71.2 µs	-70.8 µs		-70.4 µs	-70		-69.6 µs	
200 mV/div I MΩ	Ch 2 Ch 3 200 mV/div 200 mV/div 1 MΩ 1 MΩ 1 THz 1 THz	Ch 4 Bus 6650 200 mV/div eSPI 1 MΩ 1 THz			5 6 7 8	Add Add New Ref Bus		Horizontal 32 µs/div SR: 1.5625 G RL: 500 kpts	320 µs s/s 640 ps/pt ₽ 50%	Trigger	Acquisition Manual, Sample: 8 bit 0 Acqs	Analyze

Searching on a Peripheral Channel packet with command OpCode as PUT_NP and cycle type as Memory Read 64 on the eSPI bus. (Single I/O Mode)

File	Edit Utility	Help							-	ыX
Bus Deo	ode Results							×	Add N	ew
Bus 1 (eS	PI)						113 Pac	kets Decoded	Cursors	Callout
Index	Start Time	Command OpCode (h)	Cycle Type (h)	Header (h)	Address (h)	Data LSByte MSByte (h)	Response (h)	Status (h)		
53	-23.41408µs	PUT_VWIRE		VWC:1E		VWI:5E VWD:EF VWI:6B VWD:24 VWI:0F VWD:96 VWI:EA VWD:F1 VWI:D	-		Measure	Search
54	2.617915µs					-	Phase:88 Modifier:Virtual Wire RSV:0 Code:Accept	3124	Results Table	Plot
55	5.585915µs	GET_STATUS								
56	7.217915µs						Phase:08 Modifier:No Append RSV:0 Code:Accept	3185		More
57	10.18592µs	PUT_MEMRD32_SHORT			BF0BCA59	-	-			
58	13.41792µs					38 33	Phase:48 Modifier:Peripheral RSV:0 Code:Accept	33AC	Search 1 Bus: eSPI	81)
59	17.18592µs	GET_FLASH_NP					-	· /	Search: Bu	s 🔻
60	18.81792µs		Flash Write	Tag:0 Length:04C	ACEAFB63	D7 7A 72 A5 0C 9D 0A 03 09 03 CA 39 E5 96 EB 55 3D 5B 0D CB 2F 7E B	Phase:C8 Modifier:Flash Access RSV:0 Code:Accept	1305	Events: 56	
61	54.98592µs	PUT_MEMWR32_SHORT 1BYTE			6F9379A7	7D	-	-		
62	58.61792µs					reen Ship	Phase:48 Modifier:Peripheral RSV:0 Code:Accept	338C		
63	61.58592µs	GET_PC				-	-	-		
64	63.21792µs		Memory Write 32	Tag:3 Length:03C	B6F55739	C6 ED 1F E2 DE 32 18 5A C6 0F A4 95 2E 0B 6B 12 EE FA 01 3C 04 DC B5	Phase:48 Modifier:Peripheral RSV:0 Code:Accept	2345		
- <u> </u>	I Zoom Scale 220.		2000) Vertical Zoor		#u₽9πn. 2.20x zoom)			-0001 		
Ref 1 Digital 125 MS/s		920 ns	FFh	2	.76 μs	Add Add Add Add		B1B5h Acquisition Auto, Ana Sample: 8 bits	yze 📃	review
Espi_Dual							250 kpts 👎 50%		11: ENG	Aug 2022 58:44 PM :58 PM 9/2022

Searching on the Start/End event on the eSPI bus (Dual I/O Mode)

EtherCAT characteristics

Bus setup options

Characteristic	Description
Ethernet sources	Analog channels
	Digital channels
	Active math channels
	Active reference channels
Salient features	Decode capability for EtherCAT protocol in both single ended and differential modes
Bus setup (Single- Ended)	BUS 2 Display Label Position On EtherCAT O divs Set to 0 Bus Type Signal Type EtherCAT Single Diff. D+ Source Threshold Input Ch 2 0 0 V D- Input Ch 2 0 0 V Decode Format Hex V
Bus setup (Differential)	BUS 2 Display Label Position On EtherCAT O divs Set to 0 Bus Type Signal Type EtherCAT Signal Diff. Source Threshold Ch 1 V OV Display Format Bus V Decode Format Hex V
Formats available	Hex Binary Mixed Hex
Signal Type	Single ended (default) Differential

Display modes

Characteristic	Description
Bus	Bus only
Results table	Decoded packet data in a tabular view with columns containing:
	1. MAC Destination Address
	2. MAC Source Address
	3. VLAN Tag
	4. EtherType
	5. ECAT Header Length
	6. Protocol Type
	7. IP Source Address
	8. IP Destination Address
	9. Datagram Header
	10. Publisher Header
	11. Network Variable Header
	12. Mailbox Header
	13. Data
	14. Working Counter
	15. Service Data Detail
	Frame Check Sequence
Decode display	Green: Start of frame
	Yellow: MAC source address, MAC destination address, EtherType
	Gray: TPID, TCI, UDP Source Port, UDP Destination Port, Length, Checksum, Command, Index, Position, Offset, Address, Reserved, Circulating Frame, More EtherCAT datagrams, IRQ, Working Counter, PublisherID, Network Variable Count, Channel, Priority, Type
	Dark Pink: IP VersionHL, IP Service, IP Total Length, IP Identification, IP Flags, IP Fragment Offset, IP Time To Live, IP Protocol, IP Header Checksum, IP Source Address, IP Destination Address, Length, Reserved, Type, Padding, Hash, Quality
	Cyan: Data, Detail, Publisher Header
	Red: End
Error handling	FCS error

Bus search options

Characteristic	Description
Search On	Start: Select to search on Start of Frame.
	Protocol: Select to search on Protocol Types and then Frame type of each Protocol respectively.
	IP Header: Select to search on IP Header based on Identification, Source, and Destination Address Values.
	UDP Header: Set the 16-bit Source Port that you want to search.
	MAC Address: Select to search on Packets having the combination of Source and Destination Address Values.
	Tag Control Information: Sets the 16-bit tag control information that you want to search.

Characteristic	Description
	EtherCAT Header Length: Sets the 11-bit ethercat header length that you want to search.
	Datagram: Select to search on sub-fields of datagram including Datagram Header, Data, and Working Counter.
	Network Variable: Select to Search on sub-fields of network variable including Publisher Header, NV Header, and Data.
	Mailbox: Select to search on sub-fields of mailbox including Mailbox Header, Service Data, and Error Reply Service Data.
	FCS Error: Select to search on FCS Error if any.
	End of Frame: Select to search on end of frames.

	Edit Appl	ications Utility	y Help							6
Bus Dec	ode Results							×	Add N	lew
Bus 1 (E	therCAT)						12 Packet	s Decoded	Cursors	Callou
								ECAT Head		
1	44.875n	555555555555555555555555555555555555555	D5	01:23:45:67:89:01	11:22:33:44:55:66		88A4	01E	Measure	Searc
									Results Table	Plot
2	4.804875µ	555555555555555555555555555555555555555	D5	01:23:45:67:89:01	11:22:33:44:55:66		0800	028		More.
3	10.60487µ	555555555555555555555555555555555555555	D5	01:23:45:67:89:01	11:22:33:44:55:66	TPID:8100 TCI:8100	88A4	028	Search 1	
									Bus: Ether Search: Bu	
								_	Events: 2	2
Wavefo	rm View							l*	Search 2	
<u></u>	📮 💷							·····X	Bus: EtherC	
Uprizont	0ls al Zoom Scale 100	20 µs	40 µs 60 µs — (200.00x zoom) Vertic	80 µc 100 µ	us 120/μs 0x.zoom)	140 µs	160 µs		Search: Bu: Events: 4	S
								- ο ο c5θ0-mVr	Search 3	
R 1	┥┥╴┍╶┥╡┑┙╸╴┥╸╸ ┙╵╴╴┙╵╵╵╵╴╴┥╴╸	┑╶╷┰┝╴┝╶┝╶╸┥╸╸╡╺╴┿╷┑╺╢ ┙╶╵┰┝╴┝╴╪╷╸┝╴╸╡╺╴┿╷┑╺╢						0V	Bus: EtherC Search: Bu:	
R1 R2								0 V 	Bus: Ether	
R1 R2 Et	herCAT							1 0 V 0 V 0 V 0 V 0 V	Bus: EtherC Search: Bu:	
	herCAT	5h - D:77h -	D:B4h	10hC:R	(1:04h)-(Posir	tion:FFFFh)	Offset:FF	EFh	Bus: EtherC Search: Bu:	
		5h D:77h 38.3 μs	D:B4h WC:FF 38.4 µs 38.					FFh us	Bus: EtherC Search: Bu:	

Protocol Decode Results table provides a time-stamped, tabular view of all captured packets on the EtherCAT bus

File	DEMO	-	ΘX
Bus Dec		Add N	ew
Bus 1 (Et Index	Summary EtherCAT (Ethernet for Control Automation Technology) is an Ethernet-based field bussystem. EtherCAT is a way to communicate between a computer and motor drives and all sorts of analog/digital IO, Advantage over other ways like USB, R5232 and CAN to do the same type of communication is that, this type of	ursors	Callout
1	communication is Industrial Ethernet and can achieve real time communication. With EtherCAT the standard Ethernet packet (containing data) is no longer received, interpreted and copied at every slave, instead, slave devices process frames on the fly, reading and inserting data while the frames are passing through the device.	leasure	Search
	Procedures	tesults Table	Plot
2	 Notice several aspects of the display that have to do with the decoded EtherCAT bus. First, the bus waveform displayed at the bottom of the graticule shows you decoded packet content time aligned with other signals you may be looking at. Next, the bus decode results table on the top of the display provides a tabular listing of all decoded packets in the acquisition. Finally, there are three search badges. Search badge 1 indicates that there are 2 occurrences of the 		More
3	 event that was searched on (Working Counter FF10). Search badge 2 indicates that there are 4 occurrences of the event that was searched on (Publisher Header). Search badge 3 indicates that there is 1 occurrence of the event that was searched on (Service Data 0012). Use zoom to navigate around the acquisition and look at how the serial data is decoded. 	earch 1 is: EtherC earch: Bus	
Wavefor		rents: 2 earch 2	B
- B1)		is: EtherC earch: Bus rents: 4	:AT
		earch 3 is: EtherC earch: Bus rents: 1	
R2	Connection Connection Recall Demo		
B1 Et	MISCELLANEOUS		
38.1 µs	SERIAL BUS		
Ref 125 (4 GS Ethe	Active Analyze Analyz	27 /	review Aug 2021 5:16 AM

The DEMO file content provides the information of the EtherCAT bus

SMBus characteristics

Bus setup options

Characteristic	Description				
SMBus sources	Analog channels				
	Digital channels				
	Active math channels				
	Active reference channels				
Salient features	Decode capability for SMBus protocol with PEC Byte as optional.				
	Search capability for Start, Repeated Start, Stop, and Idle events.				
	Search capability for addresses such as Host Address, Device Address, and Address.				
	Search capability for Command Code, Data and UDID Data.				
	Search capability for Errors – Any, ACK, NACK.				
Bus setup	BUS 1				
PEC Byte as True	BUS 1 Display Label Position On SMBus O divs Set SMBus SMBus O divs to 0 Bus Type PEC Byte SMBCLK Ch 1 V OV SMBDAT Ch 2 V OV Display Format Bus V Decode Format Hex V				

Characteristic	Description
Formats available	Hex
	Binary
	Mixed
PEC	Optional PEC Byte – False as default

Display modes

Characteristic	Description
Bus	Bus only
Results table	Decoded packet data in a tabular view with columns containing:
	1. Protocol Type
	2. Address
	3. Read/Write
	4. Command Code
	5. Byte Count
	6. Data
	7. Acknowledgement
	PEC
Decode Display	Green: Start, Repeated Start
	Yellow: Address, Host Address, Device Address, Slave Address, Device Slave Address, Assigned Address, Targeted Slave Address, Read, Write, Read/Write, Command Code, Byte Count, Bit, Idle
	Cyan: Data, Device Capabilities, Version Revision, Interface, Vendor ID, Device ID, Subsystem Vendor ID, Subsystem Device ID, Vendor Specific ID
	Purple: PEC
	Red: End
Error Handling	Any, ACK, NACK

Bus search options

Characteristic	Description				
Search On	Start: Select to search on the start events.				
	Repeated Start: Select to search on the repeated start events.				
	Address: Sets the 7-bit address pattern that you want to search.				
	Host Address: Select to search on the host address.				
	Device Address: Set the 7-bit device address that you want to search.				
	Command Code: Sets the 8-bit command code that you want to search.				

Characteristic	Description
	Data: Sets the data pattern that you want to search
	Data Bytes: Sets the number of data bytes that you want to search (1 to 8 bytes).
	Field Bytes: Sets the field bytes as 1, 2, or 4 for UDID Data.
	UDID Data: Sets the UDID data that you want to search.
	Error Type: Sets the error bytes that you want to search. You can search on ANY, ACK, NACK, and PEC errors (PEC error search is available only when the PEC Byte in SMBus bus configuration is set as True).
	Stop: Select to search on the stop events.
	Idle: Select to search on the idle events.

Bus D	ecode Results						×	Add	New
Bus 1 ((SMBus)					311 Packe	ets Decoded	Cursors	Callout
Index							Data_LSB_N		
1	-108.4425ms	BlockWrite BlockRead Process Call Command	03	WR:0	AD	04	8D FC 7F	Measure	Search
2	-107.8005ms	BlockWrite BlockRead Process Call Response	03	RD:1		13	C8 13 D6	Results	Plot
3	-105.8765ms	Host Notify Protocol	Host Address:08	WR:0	Device Address:5		A4 6B	Table	
4	-105.4725ms	Write 32	37	WR:0	E4		FF 9E A4 F		More
5	-104.9035ms	Write 64	77	WR:0	D7		2F FF C5 E		
6	-103.9515ms	Read 32 Command	27	WR:0	16			Search 1	(B1
7	-103.7585ms	Read 32 Response	27	RD:1			39 07 08 1	Bus: SMBu Search: Bu	
8	-103.2675ms	Read 64 Command	3D	WR:0	9E			Events: 22	
9	-103.0755ms	Read 64 Response	3D	RD:1			0F 9E 9E C		
10	-102.2325ms	Prepare To ARP	61	WR:0	01				
Wave	form View								
B1)				A A A					
	-180 ms		20 ms -80 ms -80 ms	-60 ms	-40 ms	-20 ms			
Horizo	ntal Zoom Scale	100.00 us/div + (200.00x zoom)	Vertical Zoom 🕂 🦳 (1.00x zoom)			X		
th dame to	Ale annel de anner de la second				here the large stand streets	Hhman and are	+ the second		
	şMBuş								
B1	A:7	7h CC:D7h D:2Fh D:	FFh D:C5h D:EFh	D:62h	D:74h 🕂 D	:74h 🕂 D	:38h		
ul n n	իլիի զվորիկի	ոս փ փ փ ուս ու փ փ տ ուս տ փ փ տ ուս տ փ վ ուս հ	իրոր իվ ս տ դ երարիվոր տիրոր ի վ ո	սահուտ	վորիի հերակելու	╵╟┦║╙╨╜╢╢	o h h r n n th		
	-104.9 ms	-104.8 ms -104.7 ms -104.6	ms -104.5 ms -104.4 ms	-104.3 ms	-104.2 ms	-104.1 ms			
	ef 2 50 mV/div		Add Add Add Horiz		Trigger		Acquisition Auto, Ana	alyze	Preview
S 11	MS/s 🏼 🎽	1 2 3 4 5 6 1	New New DVM AFG SR: 6.	25 MS/s 160	ns/pt	s	ample: 12 bits	27	Aug 2021
	/IBus_ch		Aath Ref Bus RL: 1.	25 Mpts 🛛 👎 10	0%	0	Acqs (5:	13:06 AM

The Protocol Decode Results Table provides a time-stamped, tabular view of all captured packets on the SMBus bus. (PEC Byte set to False)

e Edit	Applications Ut	ility Help									6
5 Decode Resu	ılts								×	Add	New
1 (SMBus)								311 6	Packets Decoded	Cursors	Calle
DEMO									?		
-108.4425n	ns BlockWrite BlockRead	d Process Call Con	nmand 03	_		WR:0	AD	04	8D FC 7F .	Measure	Sear
• To deb	ug a design problem, firs	t vou must know	it evicts This o	scilloscope offe	ors Fast∆co, a fas	t waveform ca	anture mode can	able of acquiring	hundreds of D6	Results	
-10 thousa	inds of waveforms per se	cond, radically in	creasing the an	nount of time t	he oscilloscope is	live and acqu	iring waveforms	This demo illustr	ates how 68	Table	Ple
FastAc	q's high waveform captu	ire rate can find <u>c</u>	glitches and oth	er infrequent a	nomalies quickly	and display th	hem with color- <u>c</u>	grading or gray-so	ale. FE 9E A4 F		
Procedures											Mo
	a TPP passive probe to C		77						2F FF C5 E		
	ct Channel 1 to the Rare . he front panel Run / Stop			DEIVIO 3 Doaro	J.					Search 1	
	cilloscope is set to display			stence to make	it easier to see th	ne intermitten	t anomalies as th	ney appear. The ru	int pulses you	Bus: SMBu	
see are	only occurring about or	ne time per secon	d yet they are s	still easy to find				2 11		Search: Bu	
 Explore 	e the FastAcq Palette cho	pices in the Horiz	ontal configura	tion menu.						Events: 22	5
) ms		
									×		
									(D:38h)——		
Connection	n 🗩								Recall Demo		
Details	-104.8 ms							ns -104.1	Session		
Ref 2						Hor	izontal	Trigger		auisition	

The DEMO file content provides the information of the SMBus bus

Ordering information

Protocol Bundles

Specially designed SW bundles with 1 year renewable and perpetual to suit your Design and validation needs.

Validate your Protocols with our industry standard Serial analysis software available for over 30 technologies.

Pro bundle for Serial Analysis teams. Our standards expertise and Integrated Protocol Decoders help you shorten your design cycle, gain greater technical insight and improve team productivity to bring new products and services to market much faster.

Serial Decode	Description	4 Series MSO	5 Series MSO	6 Series MSO
4-RL-1	Record length enhancement to 62.5 million sample points .	V	×	×
5-RL-125M	Record length enhancement to 125 million sample points .	*	v	*
6-RL-2	Record length enhancement to 250 million sample points .	*	×	~
SRAUDIO	Audio Serial Triggering and Analysis (I2S, LI, RJ, TDM). Enables triggering on packet-level information on serial audio buses.	V	V	V
SRAUTO	Automotive Serial Triggering and Analysis (CAN, CAN FD, CAN XL, LIN, FlexRay). Enables triggering on packet-level information on CAN/CAN FD/CAN XL/LIN/FelxRay.	V	V	V
SRNET	Ethernet Serial Triggering and Analysis (10BASE-T, 100BASE-T). Enables decoding and analysis on Ethernet buses.	V	V	V
SRI3C	I3C Serial Decoding and Analysis. Enables decoding and searching on packet- level information on MPI I3C.	V	V	V
SRNRZ	NRZ Serial Decoding and Analysis. Supports NRZ with normal and inverted polarity with Bit order (MSB or LSB first).	V	V	V
SRPM	Power Management Serial Triggering and Analysis. Enables triggering on packet-level information on SPMI buses.	v	V	V
SRUSB2	USB 2.0 Serial Triggering and Analysis. Enables triggering on packet-level information on USB 2.0 buses.	V	V	V
SRUSB3	USB 3.0, USB 3.1 Gen 1, USB 3.2 Gen 1 Serial Decoding and Analysis. Extensive search options.	*	*	V
SRPCIE321	PCIe Serial Decoding and Analysis. Extensive search options.	*	×	v
SRMDIO	MDIO Protocol Decoder and Search. Extensive search options.	~	v	~
SRSVID	SVID Protocol Decider and Search. Supports version rev.1.92. Extensive search options	v	V	V
SR8B10B	8B10B Serial Decoding and Analysis. Finds and displays parity error if found in 4-bit or 6-bit for the 10-bit symbol in 8b10b	*	V	V
SRETHERCAT	ETHERCAT Protocol Decoder and search. Enables decoding and analysis on EtherCAT buses.	V	V	V
SRSMBUS	SMBUS Protocol Decoder and search. Enables decoding and analysis on SMbus buses.	v	V	V
1 Year License		4-PRO-SERIAL-1Y	5-PRO-SERIAL-1Y	6-PRO-SERIAL-1Y
Perpetual License		4-PRO-SERIAL- PER	5-PRO-SERIAL- PER	6-PRO-SERIAL- PER

Pro Bundle for Military and Aerospace designers. Our Software design tools help you shorten your design cycle, gain greater technical insight and improve team productivity to bring new products and services to market much faster.

Serial Decode	Description	4 Series MSO	5 Series MSO	6 Series MSO
4-RL-1	Record length enhancement to 62.5 million sample points.	~	×	×
Table continued				

Serial Decode	Description	4 Series MSO	5 Series MSO	6 Series MSO
5-RI-125M	Record length enhancement to 125 million sample points.	*	V	*
6-RL-2	Record length enhancement to 250 million sample points.	*	*	~
SRAERO	Aerospace Serial Triggering and Analysis (MIL-STD-1553, ARINC429). Enables triggering on packet-level information.	¥	V	V
SRSPACEWIRE	SpaceWire serial analysis. Enables decoding and analysis on SpaceWire buses.	V	V	~
MTM		V	V	v
SRNRZ	NRZ Serial Decoding and Analysis. Supports NRZ with normal and inverted polarity with Bit order (MSB or LSB first).	×	V	V
DJA	Jitter Analysis Package including TIE, Eye diagram, Histogram and other advanced analysis measurements.	v	V	~
1 Year License Perpetual License		4-PRO- MILGOV-1Y	5-PRO- MILGOV-1Y	6-PRO- MILGOV-1Y
r erpetual License		4-PRO-MILGOV- PER	5-PRO-MILGOV- PER	6-PRO-MILGOV- PER

To add to an instrument at purchase

Serial bus type	3 Series MDO Option	4 Series MSO Option	5 Series MSO Option	6 Series MSO Option	Description
MIL-STD-1553, ARINC 429	3-SRAERO	4-SRAERO	5-SRAERO	6-SRAERO	Aerospace Serial Triggering and Analysis (MIL-STD-1553, ARINC 429). Enables triggering on packet-level information on MIL-STD-1553 and ARINC 429 buses as well as analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with time stamp information.
I ² S, LJ, RJ, TDM	3-SRAUDIO	4-SRAUDIO	5-SRAUDIO	6-SRAUDIO	Audio Serial Triggering and Analysis (I ² S, LJ, RJ, TDM). Enables triggering on packet-level information on serial audio buses as well as analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with time stamp information.
8b10b	N/A	N/A	5-SR8B10B	5-SR8B10B	8B10B Serial Decoding and Analysis. Enables decoding and searching the packet-level information on buses with analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with time stamp information. Finds and displays parity error if found in 4-bit or 6-bit for the 10-bit symbol in 8b10b.
NRZ	N/A	4-SRNRZ	5-SRNRZ	6-SRNRZ	NRZ Serial Decoding and Analysis. Enables decoding and searching the packet-level information on buses with analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with time stamp information. Variants like NRZ-I, NRZ-M, NRZ-S, and NRZ-C are not supported currently. Supports only NRZ with normal and inverted polarity with Bit Order (MSB or LSB First).
CAN, CAN FD, CAN XL, LIN, FlexRay	3-SRAUTO (Except CAN XL)	4-SRAUTO	5-SRAUTO	6-SRAUTO	Automotive Serial Triggering and Analysis (CAN, CAN FD, CAN XL, LIN, FlexRay). Enables triggering on packet-level information on CAN/CAN FD/CAN XL/LIN/FlexRay buses as well as analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with time stamp information.

Serial bus type	3 Series MDO Option	4 Series MSO Option	5 Series MSO Option	6 Series MSO Option	Description
Automotive 10BASE-T1S, 100BASE-T1	N/A	N/A	5-SRAUTOEN1	6-SRAUTOEN1	10BASE-T1S Serial trigger with decoder and 100Base-T1 Automotive Ethernet serial decode. Includes analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with time stamp information.
SENT	N/A	4-SRAUTOSEN	5-SRAUTOSEN	6-SRAUTOSEN	Automotive Sensor Serial Triggering and Analysis (SENT). Enables triggering on packet-level information on SENT buses as well as analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with time stamp information.
RS-232/422/485, UART	3-SRCOMP	4-SRCOMP	5-SRCOMP	6-SRCOMP	Computer Serial Triggering and Analysis (RS-232, RS-422, RS-485, UART). Enables triggering on packet-level information on RS-232/422/485 and UART buses as well as analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with time stamp information.
I ² C, SPI	3-SREMBD	4-SREMBD	5-SREMBD	6-SREMBD	Embedded Serial Triggering and Analysis (I ² C, SPI). Enables triggering on packet-level information on I ² C and SPI buses as well as analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with time stamp information.
Ethernet	N/A	4-SRENET	5-SRENET	6-SRENET	Ethernet Serial Triggering and Analysis (10BASE-T, 100BASE-T). Enables triggering on packet-level information on Ethernet buses as well as analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with time stamp information.
13C	N/A	4-SRI3C	5-SRI3C	6-SRI3C	I3C Serial Decoding and Analysis. Enables decoding and searching on packet-level information on MIPI I3C buses with analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with time stamp information.
SPMI	N/A	4-SRPM	5-SRPM	6-SRPM	Power Management Serial Triggering and Analysis (SPMI). Enables triggering on packet-level information on SPMI buses as well as analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with time stamp information.
Spacewire	N/A	4-SRSPACEWIRE	5-SRSPACEWIRE	6-SRSPACEWIRE	Spacewire serial analysis. Enables decoding and analysis on Spacewire buses.
USB 2.0	3-SRUSB2	4-SRUSB2	5-SRUSB2	6-SRUSB2	USB 2.0 Serial Triggering and Analysis. Enables triggering on packet-level information on USB 2.0 buses as well as analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with time stamp information.
USB 3.0	N/A	N/A	N/A	6-SRUSB3	USB serial triggering and analysis (USB 3.0) for 6 Series oscilloscopes.
USB 3.1 Gen 1	N/A	N/A	N/A	6-SRUSB3	USB serial triggering and analysis (USB 3.1 (Gen 1, 2*)) for 6 Series oscilloscopes, * appears when upgrade is available.

Serial bus type	3 Series MDO Option	4 Series MSO Option	5 Series MSO Option	6 Series MSO Option	Description
USB 3.2 Gen 1	N/A	N/A	N/A	6-SRUSB3	USB serial triggering and analysis (USB 3.2 (Gen 1, 2*)) for 6 Series oscilloscopes, * appears when upgrade is available.
Serial options bundle	3-BND	N/A	N/A	N/A	Adds all serial analysis options and the power analysis option available for an instrument.
PCle	N/A	N/A	N/A	6-SRPCIE321	PCIe serial decoding and analysis (PCIe Gen 1/Gen 2/Gen 3) for 6 Series B oscilloscope.
PSI5	N/A	4-SRPSI5	5-SRPSI5	6-SRPSI5	PSI5 Serial Decoding (v1.3 and 2.1) and analysis. Enables decoding and Search Packet level information with analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with time stamp information.
MDIO	N/A	4-SRMDIO	5-SRMDIO	6-SRMDIO	MDIO Protocol Decoder and Search, No Hardware Trigger; Node locked
SVID	N/A	4-SRSVID	5-SRSVID	6-SRSVID	SVID Protocol Decoder and Search, No Hardware Trigger; Node locked
e-USB2	N/A	4-SREUSB2	5-SREUSB2	6-SREUSB2	eUSB2 Protocol Decoder and Search; Node locked
DPHY	N/A	N/A	5- SRDPY	6- SRDPY	DPHY CSI/DSI (DSI2.0 /CSI2.0 protocols decoder. Supports HS data transmission burst, and escape mode functionality. Data transmission can be with 8-bit raw data or using 8b9b encoded symbol
MANCHESTER	N/A	4-SRMANCH	5-SRMANCH	6-SRMANCH	Supports Generic Manchester decode. Decode of packets as per packet structure defined. Decode of Errors like Sync, Parity, Manchester
SDLC		4-SRSDLC	5-SRSDLC	6-SRSDLC	SDLC decoder and Search. Extensive search options on captured waveforms like unnumbered , Supervisory, address etc
CPHY 1.2	N/A	N/A	5-SRCPHY	6-SRCPHY	MIPI C-PHY CSI/DSI Protocol Decoder and Search
1-Wire	N/A	4-SRONEWIRE	5-SRONEWIRE	6-SRONEWIRE	1-Wire Protocol Decoder and search
eSPI	N/A	4-SRESPI	5-SRESPI	6-SRESPI	eSPI Protocol Decoder and search
CXPI	N/A	4-SRCXPI	5-SRCXPI	6-SRCXPI	CXPI Protocol Decoder and search
ETHERCAT	N/A	4-SRETHERCAT	5-SRETHERCAT	6-SRETHERCAT	ETHERCAT Protocol Decoder and search
SMBUS	N/A	4-SRSMBUS	5- SRSMBUS	6- SRSMBUS	SMBUS Protocol Decoder and search
NFC	N/A	4-RFNFC	5-RFNFC	6-RFNFC	NFC protocol decode and search

To upgrade an already purchased instrument

Serial bus ³	3 Series MDO Node-Locked License ⁴	4 Series MSO Node-Locked/ Floating License	5 Series MSO Node-Locked/ Floating License	6 Series MSO Node-Locked/ Floating License	
MIL-STD-1553, ARINC 429	SUP3 SRAERO	SUP4-SRAERO	SUP5-SRAERO	SUP6-SRAERO	
		SUP4-SRAERO-FL	SUP5-SRAERO-FL	SUP6-SRAERO-FL	
I ² S, LJ, RJ, TDM	SUP3 SRAUDIO	SUP4-SRAUDIO	SUP5-SRAUDIO	SUP6-SRAUDIO	
		SUP4-SRAUDIO-FL	SUP5-SRAUDIO-FL	SUP6-SRAUDIO-FL	
CAN, CAN FD, CAN XL, LIN,	SUP3 SRAUTO	SUP4-SRAUTO	SUP5-SRAUTO	SUP6-SRAUTO	
FlexRay	(Except CAN XL)	SUP4-SRAUTO-FL	SUP5-SRAUTO-FL	SUP6-SRAUTO-FL	
8B10B	N/A	N/A	SUP5-SR8B10B	SUP6-SR8B10B	
			SUP5-SR8B10B-FL	SUP6-SR8B10B-FL	
NRZ	N/A	SUP4-SRNRZ	SUP5-SRNRZ	SUP6-SRNRZ	
		SUP4-SRNRZ-FL	SUP5-SRNRZ-FL	SUP6-SRNRZ-FL	
10BASE-T1S, 100BASE-T1	N/A	N/A	SUP5-SRAUTOEN1	SUP6-SRAUTOEN1	
Automotive Ethernet			SUP5-SRAUTOEN1-FL	SUP6-SRAUTOEN1-FL	
SENT	N/A	SUP4-SRAUTOSEN	SUP5-SRAUTOSEN	SUP6-SRAUTOSEN	
		SUP4-SRAUTOSEN-FL	SUP5-SRAUTOSEN-FL	SUP6-SRAUTOSEN-FL	
RS-232/422/485, UART	SUP3 SRCOMP	SUP4-SRCOMP	SUP5-SRCOMP	SUP6-SRCOMP	
		SUP4-SRCOMP-FL	SUP5-SRCOMP-FL	SUP6-SRCOMP-FL	
I ² C, SPI	SUP3 SREMBD	SUP4-SREMBD	SUP5-SREMBD	SUP6-SREMBD	
		SUP4-SREMBD-FL	SUP5-SREMBD-FL	SUP6-SREMBD-FL	
Ethernet	N/A	SUP4-SRENET	SUP5-SRENET	SUP6-SRENET	
		SUP4-SRENET-FL	SUP5-SRENET-FL	SUP6-SRENET-FL	
I3C	N/A	SUP4-SRI3C	SUP5-SRI3C	SUP6-SRI3C	
		SUP4-SRI3C-FL	SUP5-SRI3C-FL	SUP6-SRI3C-FL	
SPMI	N/A	SUP4-SRPM	SUP5-SRPM	SUP6-SRPM	
		SUP4-SRPM-FL	SUP5-SRPM-FL	SUP6-SRPM-FL	
Spacewire	N/A	SUP4-SRSPACEWIRE	SUP5-SRSPACEWIRE	SUP6-SRSPACEWIRE	
		SUP4-SRSPACEWIRE	SUP5-SRSPACEWIRE-FL	SUP6-SRSPACEWIRE-FL	
USB 2.0	SUP3 SRUSB2	SUP4-SRUSB2	SUP5-SRUSB2	SUP6-SRUSB2	
		SUP4-SRUSB2-FL	SUP5-SRUSB2-FL	SUP6-SRUSB2-FL	
USB 3.0	N/A	N/A	N/A	SUP6-SRUSB3	
				SUP6-SRUSB3-FL	

³ Software is supplied with the instrument firmware. Always download and install the latest version of the firmware. Option documentation is part of the application Help.

 $^{^{\}rm 4}$ $\,$ 3 Series MDO option license names do not have a dash in the option number.

Serial bus ³	3 Series MDO Node-Locked License ⁴	4 Series MSO Node-Locked/ Floating License	5 Series MSO Node-Locked/ Floating License	6 Series MSO Node-Locked/ Floating License	
USB 3.1 Gen 1	N/A	N/A	N/A	SUP6-SRUSB3	
				SUP6-SRUSB3-FL	
USB 3.2 Gen 1	N/A	N/A	N/A	SUP6-SRUSB3	
				SUP6-SRUSB3-FL	
Serial analysis bundle ⁵	SUP3 BND	N/A	N/A	N/A	
PCIe Gen 1/Gen 2/Gen 3	N/A	N/A	N/A	SUP6-SRPCIE321	
				SUP6-SRPCIE321-FL	
PSI5	N/A	SUP4-SRPSI5	SUP5-SRPSI5	SUP6-SRPSI5	
		SUP4-SRPSI5-FL	SUP5-SRPSI5-FL	SUP6-SRPSI5-FL	
MDIO	N/A	SUP4-SRMDIO	SUP5-SRMDIO	SUP6-SRMDIO	
		SUP4-SRMDIO-FL	SUP5-SRMDIO-FL	SUP6-SRMDIO-FL	
SVID	N/A	SUP4-SRSVID	SUP5-SRSVID	SUP6-SRSVID	
		SUP4-SRSVID-FL	SUP5-SRSVID-FL	SUP6-SRSVID-FL	
e-USB2	N/A	SUP4-SREUSB2	SUP5-SREUSB2	SUP6-SREUSB2	
		SUP4-SREUSB2-FL	SUP5-SREUSB2-FL	SUP6-SREUSB2-FL	
DPHY	N/A	N/A	SUP5-SRDPHY	SUP6-SRDPHY	
			SUP5-SRDPHY -FL	SUP6-SRDPHY-FL	
MANCHESTER	N/A	SUP4-SRMANCH	SUP5-SRMANCH	SUP6- SRMANCH	
		SUP4-SRMANCH-FL	SUP5-SRMANCH-FL	SUP6- SRMANCH -FL	
SDLC	N/A	SUP4-SRSDLC	SUP5- SRSDLC	SUP6- SRSDLC	
		SUP4- SRSDLC -FL	SUP5- SRSDLC -FL	SUP6- SRSDLC -FL	
CPHY 1.2	N/A	N/A	SUP5-SRCPHY	SUP6-SRCPHY	
1-Wire	N/A	SUP4-SRONEWIRE	SUP5-SRONEWIRE	SUP6-SRONEWIRE	
eSPI	N/A	SUP4-SRESPI	SUP5-SRESPI	SUP6-SRESPI	
		SUP4-SRESPI-FL	SUP5-SRESPI-FL	SUP6-SRESPI-FL	
CXPI	N/A	SUP4-SRCXPI	SUP5-SRCXPI	SUP6-SRCXPI	
		SUP4-SRCXPI-FL	SUP5-SRCXPI-FL	SUP6-SRCXPI-FL	
ETHERCAT	N/A	SUP4-SRETHERCAT	SUP5-SRETHERCAT	SUP6-SRETHERCAT	
		SUP4-SRETHERCAT-FL	SUP5-SRETHERCAT-FL	SUP6-SRETHERCAT-FL	
Table continued					

³ Software is supplied with the instrument firmware. Always download and install the latest version of the firmware. Option documentation is part of the application Help.

^{4 3} Series MDO option license names do not have a dash in the option number.

Serial bus ³	3 Series MDO Node-Locked License ⁴	 5 Series MSO Node-Locked/ Floating License	6 Series MSO Node-Locked/ Floating License
SMBUS	N/A	SUP5-SRSMBUS SUP5-SRSMBUS-FL	SUP6-SRSMBUS SUP6-SRSMBUS-FL
NFC	N/A	SUP5-RFNFC SUP5-RFNFC-FL	SUP6-RFNFC SUP6-RFNFC-FL

Recommended probes

Please refer to www.tek.com/probes for further information on the recommended models of probes and any necessary probe adapters.

Partner products ordering information

To add to an instrument at purchase (Supports Windows Option)

Serial bus type	Minimum Bandwidth	Recommended Probes	5 Series MSO Option	6 Series/6B Series MSO Option	Description
PGY-eMMC (Windows Option Only)	2 GHz	Standard probes of MSO5/6 series	PGY-eMMC	PGY-eMMC	eMMC and SD (UHS-I) electrical measurements and Protocol decoding. software conforms to eMMC version 4.41,4.51,5.0, 5.1 specification. Supports Boot, SDR, DDR, HS200 and HS400 mode for electrical measurement and protocol Decode
PGY- SDIO(Windows Option Only)	2 GHz	Standard probes of MSO5/6 series	PGY-I2C	PGY-I2C	I2C Electrical Validation and Protocol decode SW
PGY-QSPI(Windows Option Only)	500 MHz	Standard probes of MSO5/6 series	PGY-SPI	PGY-SPI	Electrical measurements compliance testing and protocol decoding as specified in QSPI specification. Supports Single and Dual Transfer rate (STR/DTR), electrical measurements and compliance testing for Ext SPI, Dual SPI and Quad SPI. Supports Triggering on command index and on S# falling edge. Supports Analog and Digital Channels of Tektronix MSO Series

Reference Selling of List of protocols supported on MSO series (please note: Windows only)

Serial bus type	Minimum Bandwidth	Recommended Probes	Ordering	5 Series MSO Option	6 Series/6B Series MSO Option	Description
RFFE	500 MHz	Standard probes of MSO5/6 series	Reference Selling. Contact: contact@prodigytec hno.com	PGY-RFFE	PGY-RFFE	RFFE Protocol Trigger & Decode Analysis Software. PGY-RFFE utilizes the hardware based real-time RFFE protocol aware trigger, protocol analysis of long acquisition record length up to 125MB to provide superior RFFE Protocol Analysis result at press of button.

³ Software is supplied with the instrument firmware. Always download and install the latest version of the firmware. Option documentation is part of the application Help.

⁴ 3 Series MDO option license names do not have a dash in the option number.

⁵ All serial bus and power analysis options that are available for an instrument.

Serial bus type	Minimum Bandwidth	Recommended Probes	Ordering	5 Series MSO Option	6 Series/6B Series MSO Option	Description
125	500 MHx and above	standard probes	Reference Selling. Contact: contact@prodigytec hno.com	PGY-I2S	PGY-I2S	I2S Electrical, Audio and Protocol Testing SW
12C	500 MHz and above	standard probes	Reference Selling. Contact: contact@prodigytec hno.com	PGY-I2C	PGY-I2C	I2C Electrical Validation and Protocol decode SW
SPI	500 MHz and above	standard probes	Reference Selling. Contact: contact@prodigytec hno.com	PGY-SPI	PGY-SPI	SPI Electrical Validation and Protocol decode SW
13C	500 MHz and above	standard probes	Reference Selling. Contact: contact@prodigytec hno.com	PGY-I3C	PGY-I3C	I3C Electrical Validation, Protocol trigger and Decode software
JTAG	500 MHz and above	standard probes	Reference Selling. Contact: contact@prodigytec hno.com	PGY-JTAG	PGY-JTAG	JTAG Protocol decode Software
ONFI	4 GHz and above	Contact Prodigy	Reference Selling. Contact: contact@prodigytec hno.com	PGY-ONFI	PGY-ONFI	ONFI Electrical Timing Analysis Sw
SPMI	500 MHz and above	standard probes	Reference Selling. Contact: contact@prodigytec hno.com	PGY-SPMI	PGY-SPMI	SPMI Protocol Decode Software
MPHY	16 GHz and above	Contact Prodigy	Reference Selling. Contact: contact@prodigytec hno.com	PGY-UPRO PGY-LLI PGY-UFS(needs PGY-UPRO)	PGY-UPRO PGY-LLI PGY-UFS(needs PGY-UPRO)	MIPI MPHY -UniPro/LLI/UFS Protocol Decode Sw
USB 2.0	2 GHz	Contact Prodigy	Reference Selling. Contact: contact@prodigytec hno.com	PGY-USB	PGY-USB	USB 2.0 Protocol Decode Sw
USB-PD	500 MHz and above	Standard probes	Reference Selling. Contact: contact@prodigytec hno.com	PGY-PD	PGY-PD	USB PD (CC) Protocol Analysis Sw
UART	500 MHz and above	Standard probes	Reference Selling. Contact: contact@prodigytec hno.com	PGY-UART	PGY-UART	UART Electrical Validation and Protocol Decode Software
KX/KR	12 GHz and above	Contact Prodigy	Reference Selling. Contact: contact@prodigytec hno.com	PGY-NEGO	PGY-NEGO	KX/KR DME and Line Training Analysis Sw

Serial bus type	Minimum Bandwidth	Recommended Probes	Ordering	5 Series MSO Option	6 Series/6B Series MSO Option	Description
10Base-T1S	500 MHz and above	Standard probes	Reference Selling. Contact: contact@prodigytec hno.com	PGY-10Base T1S	PGY-10Base T1S	10 Base-T1S Protocol Decode Sw
100Base-T1	2 GHz and above	Standard probes	Reference Selling. Contact: contact@prodigytec hno.com	PGY-100Base T1	PGY-100Base T1	100 Base-T1 Protocol Decode Sw
SVID	500 MHz and above	Standard probes	Reference Selling. Contact: contact@prodigytec hno.com	PGY-SVID	PGY-SVID	SVID Protocol Decode Sw
USB3 Gen 1	23 GHz and above	Contact Prodigy	Reference Selling. Contact: contact@prodigytec hno.com	PGY-USB3 Gen1	PGY-USB3 Gen1	USB3 Gen 1 5 Gbps Protocol Decode Sw
USB3 Gen 2	23 GHz and above	Contact Prodigy	Reference Selling. Contact: contact@prodigytec hno.com	PGY-USB3 Gen1	PGY-USB3 Gen1	USB3 Gen 2 Protocol Decode Sw
8B10B	4 GHz and above	Contact Prodigy	Reference Selling. Contact: contact@prodigytec hno.com	PGY-8B10B	PGY-8B10B	8B10B Protocol Decode Sw
1000T1-LT	4 GHz and above	Contact Prodigy	Reference Selling. Contact: contact@prodigytec hno.com	PGY-1000T1-LT	PGY-1000T1-LT	1000BaseT1 Line Training Decode Software

Terms and Conditions

Lead time of 2-3 Weeks ARO.



Tektronix is ISO 14001:2015 and ISO 9001:2015 certified by DEKRA.

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* European toll-free number. If not accessible, call: +41 52 675 3777

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> 18 Nov 2024 61W-61101-22 tek.com

