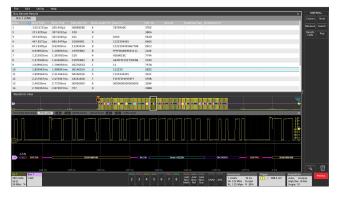
Tektronix[®]

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, 100BASE-T1, SENT, RS-232/422/485, UART, USB 2.0, USB 3.0, Ethernet, I3C, SPMI, Spacewire, 8b10b, NFC, NRZ, MIL-STD-1553, ARINC 429, I²S, LJ, RJ, 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, Ethernet¹, SPMI¹, MIL-STD-1553, ARINC 429, I²S, LJ, RJ, PSI5, 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, timestamped 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, 100BASE-T1, SENT, RS-232/422/485, UART, USB 2.0, USB 3.0, Ethernet, I3C, SPMI, Spacewire, 8b10b, NRZ, MIL-STD-1553, ARINC 429, I²S, LJ, RJ, 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, Ethernet, I3C, SPMI, MIL-STD-1553, ARINC 429, I²S, LJ, RJ, 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

¹ Not available for 3 Series MDO.

 \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.

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

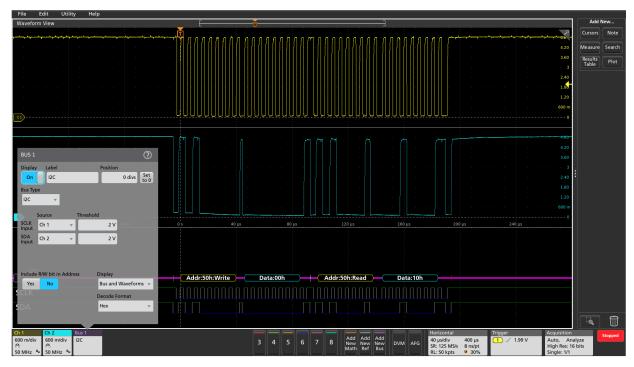
Display modes

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

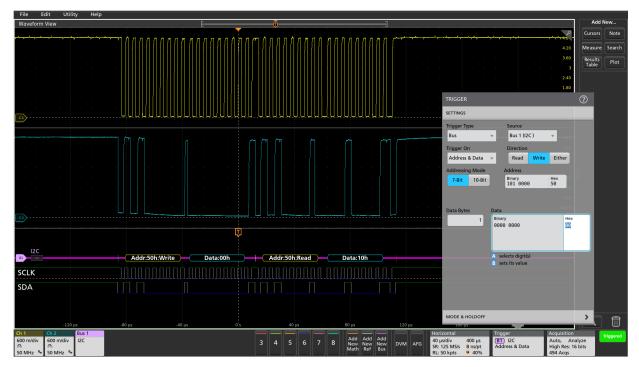
Bus trigger and search options

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

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)



Color-coded I^2C bus display, using hexadecimal display format.



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

SPI characteristics

Bus setup options

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

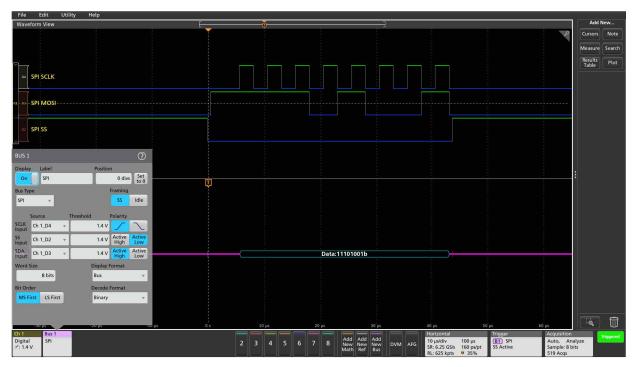
Bus trigger and search options

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

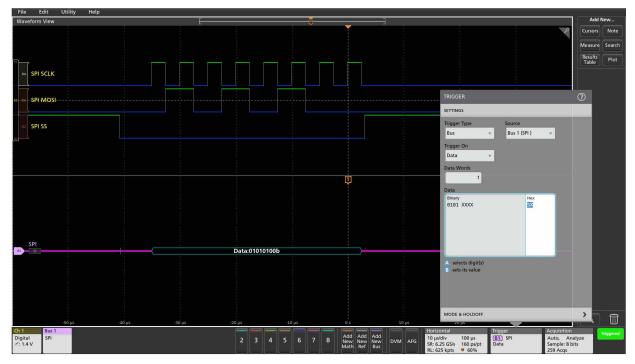
Bus decode

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



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

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

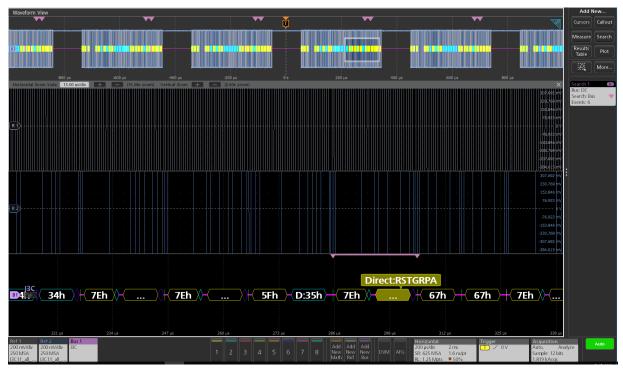
Bus search options

Characteristic	Description
Search On	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

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)

Bus Decode	Results														×	Add N	ew
Bus 1 (I3C)														70 Packets	Decoded	Cursors	Callout
Index																	
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3	242.1875ns	Direct:SETDASA						1								Table	
4	339.6875ns		7E:Write					1								0	More
5	438.4375ns	Direct:GETMXDS		-				0									
6	535.9375ns		23:Read		AC AC ACACAB			110								Search 1	Ð
7	804.6875ns	Broadcast:DEFSLVS			01 56			0011111111								Bus: IBC Search: Bu	_
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									
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monzontai ze	om acale 100.			m) Yertical Zoom	(1.40x z	oom)						_		_	×		
SCLK -		Threshold													1.428571 V		
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i3c_Clock	i3c_Data					الـــالــــا			Lines Cous		L: 12.5 kpts	25%		0 A	kcqs		

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.



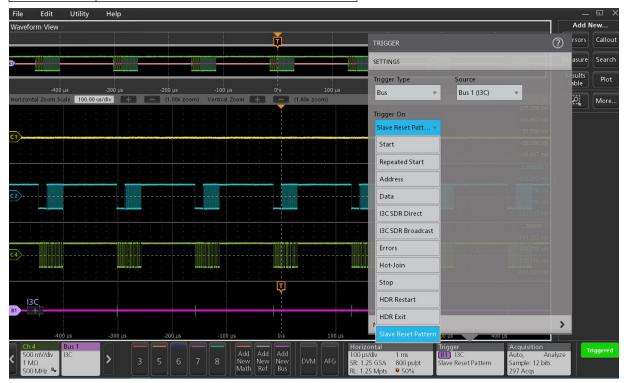
The Protocol Decode Results Table provides a time-stamped, tabular view of all captured packets on the I3C bus.



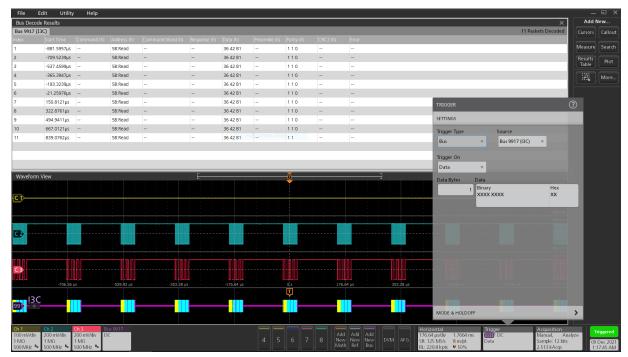
Searching on a specific data pattern on the I3C bus and automatically searching on Sync.

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
UARI	Digital channels
	Active Math channels ¹
	Active Reference channels ¹
Sources, RS-422, RS-485	Analog channels
KS-400	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

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

Bus decode

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)

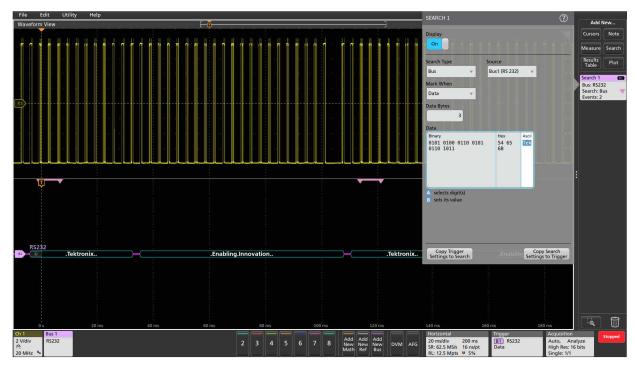
Display modes

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

Table continued...



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,	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, Tx	Differential	
Diff		
Bit Rate Selection:		
Predefined list of rates	10 kb/s - 1 Mb/s	
Table continued	I	

Characteristic	Description
Custom	All but 3 Series MDO: 1 kb/s - 1 Mb/s 3 Series MDO: 10 kb/s - 1 Mb/s
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			
Table continued				

Characteristic	Description
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

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

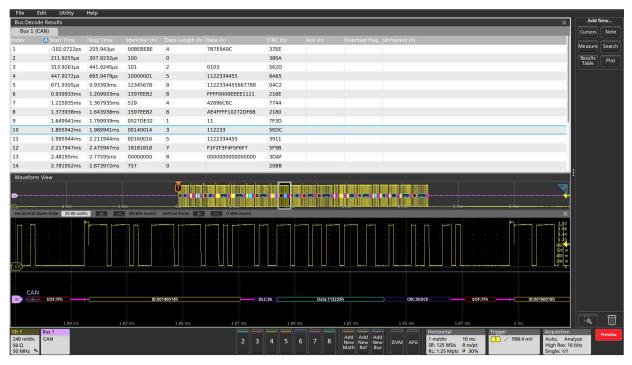
Bus decode

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)

Symbolic bus search options

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

Table continued...



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	Analog channels
Tx	Digital channels
(Single-ended probing)	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
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

Description
Start of Frame
End of Error
Start of Frame
Type of Frame (XL Data Frame)
Priority Identifier
Data (1 byte)

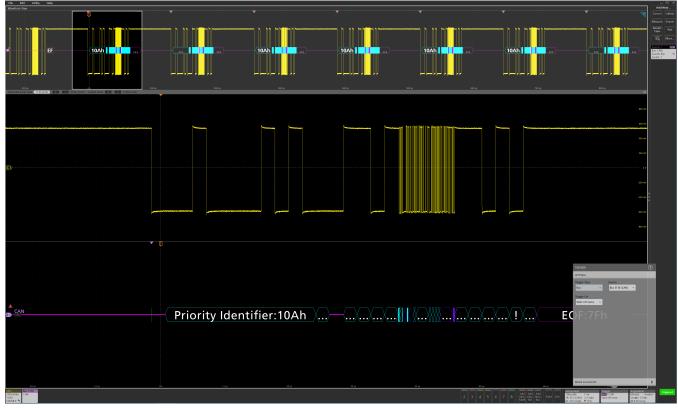
Characteristic	Description
	XL Bits (Acceptance Field, Virtual CAN Network ID, SDU Type, Simple Extended Content, Stuff Bit Count, Arbitration to Data Sequence, Data to Arbitration Sequence)
	ADS Type (Arbitration to Data High Bit, Data High Bit 1, Data High Bit 2, Data Low Bit)
	DAS Type (DAH, Active 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)
	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)
Table continued	

Characteristic	Description		Characteristic	Description
Search On	Start of Frame			DAS Type (DAH, Active High 1, Active High 2,
	Type of Frame (XL	Data Frame)		Active Low 1)
	Priority Identifier			End of Frame
	Data (1 byte)			Error (Missing Ack, XL Form Error, CRC, Any
		e Field, Virtual CAN		Error)
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® CAN Prio	rity Identifier:3BCh、,-			
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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	Digital channels	
(single-ended probing)	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	Single -ended	
Probing:	Differential	
CAN_H, CAN_L, Rx, or Tx		
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	

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 , <, <, >, \geq)
	Identifier and Data
	End of Frame
	Error (Missing Ack, Bit Stuffing Error, FD Form Error, Any Error)

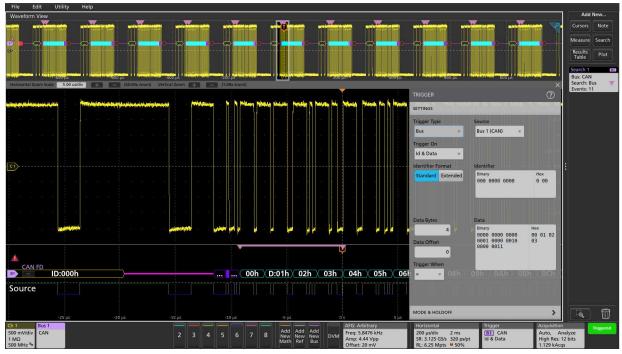
Symbolic bus search options

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:	
Predefined list of rates	1.2 kb/s - 19.2 kb/s
Custom	All but 3 Series MDO: 1 kb/s - 100 kb/s
	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	Yes
ID	No
Formats Available	Hex
	Binary
	Mixed

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

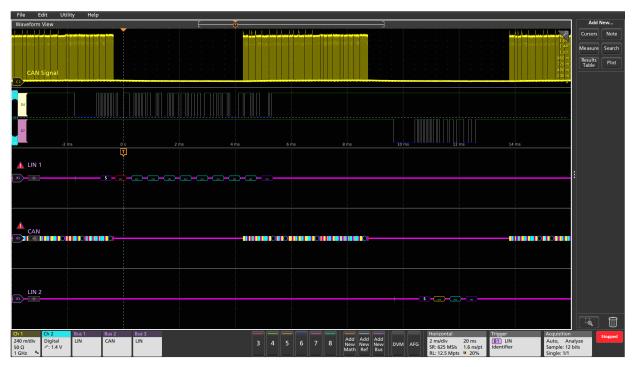
Bus trigger and search options

Characteristic	Description
Trigger and/or Search	Sync
	Identifier
	Data (number of bytes 1-8, trigger or search when =, ≠, <, ≤, >, ≥, 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)

File Ed	2	Help											-	
Bus Decode	and the start of the start			_			_					×	Add	
Bus 1 (LI Index						Data (h)						_	Cursors	Note
1		-100.3323ms	3C	00	ennea (n/	80 FF FF FF FF FF	FF FF	80	Checksum: Checksum, calculated 07h	i		_	Measure	Search
2		3.411407ms	00	10		2F 45 C3		90	Checksum: Checksum, calculated 2Fh				Results	
3	105.8623ms			11		1E AF 74 99 E2 45	80.83	2A	checksum, checksum, culculated 211				Table	Plot
1	133.1646ms		U.			10 11 74 33 62 43	00.05	-						
		219.6142ms	02	11		54 43 A8 2E C6 B6	5 81 2E	AO	Identifier: Parity					
		324.6193ms	03	00		12 48 B1 16 14		C9	Checksum: Checksum, calculated FFh					
	425.9819ms	429.0045ms		11		3F		FB	Sync: Invalid sync field					
1		536.7754ms	05	10		98 1D E7		DC						
	639.3519ms	643.5739ms	06	00		67 23		6F						
LO			07	01		DC 2C 34 8E E8		4B	Checksum: Checksum, calculated 04h	1				
Waveform \	view		(100.00x 200m)	100 r ¥		200 ms.	30	0 ms	400 ms 500 ms	600 ms	700 ms	×		
- 84														
LIN 81			Syn	 1:01	h0:1E	h D:AFh	Data:74	h) Data:99}	Data:#2h) Data:45h D:8Ch)	>			
10	5 ms	106 ms	107	ms	108 ms	10)9 ms	11	ns 111 ms	112 ms	113 ms	114 ms		1
	Bus 1 LIN					1 3	4 5	6 7	8 Add Add Add New New New New DVM AFG Math Ref Bus	Horizontal 100 ms/div 1 s SR: 12.5 MS/s 80 ns/pt RL: 12.5 Mpts 9 20%	Trigger DA / 1.4 V	Acquisition Auto, Ana Sample: 12 t Single: 1/1	alyze	

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	Analog channels
(Bdiff)	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	Analog channels
(Tx, 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)

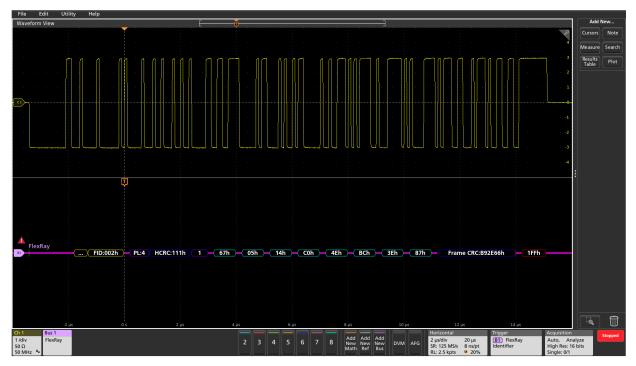
Display modes

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
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 Eo	dit Utility	Help										
Bus Decode	e Results								>	K Waveform View	Add	New
Bus 1 (SEN	()										Cursors	Note
Index 🔼	Start Time	Status	Chan 1 (h)			S ID		S Data (ł				
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					607h C.0075h C. 07h C.075h C.	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) X		
50	-8.126378ms	10 00	95D	A54	С	Sta	rt					
51	-7.274379ms	10 00	OBE	F4A	D							
52	-6.422379ms	10 00	E48	083	0							
53	-5.570378ms	10 00	41A	DCB	F			-		an in the second state of the s		
54	-4.718377ms	10 00	5D8	FD7	F							
55	-3.866378ms	11 00	1F7	0E5	2			÷.				
56	-3.014378ms	00 00	3C1	3BC	0					- 		
57	-2.162378ms	00 00	F08	3D5	5				-	1 and 1 is the state of the field of the state of the state of the state of the state of the $360{ m mm}$		
58	-1.310377ms	00 00	A97	4A9	F							
59	-458.378µs	00 00	F06	DFB	6							
60	393.6206µs	00 00	27F	C72	С					-340 mV		
61	1.245621ms	01 00	532	FB3	Α							
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	Sta	rt			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							
<mark>Ch 1</mark> 340 mV/div 1 MΩ 500 MHz ⁸ *	Bus 1 SENT				2	3 4	5	6 7	8	- 175 ms -125 ms -10 ms -75 ms -1ms -25 ms 0 s 25 ms Add Add	alyze	Stopped

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

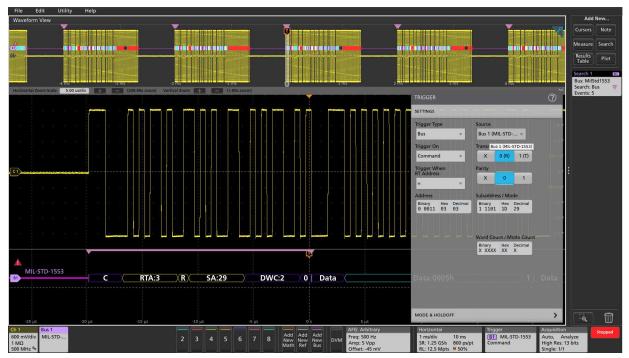
Characteristic	Description
Trigger and/or Search On	Sync Command (Transmit/Receive Bit, Parity, Subaddress / Mode, Word Count / Mode Count, and RT Address =, ≠, <, ≤, >, ≥, Inside Range, Outside Range) Status (Parity,

Characteristic	Description
	Bit 9 - Message Error,
	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		

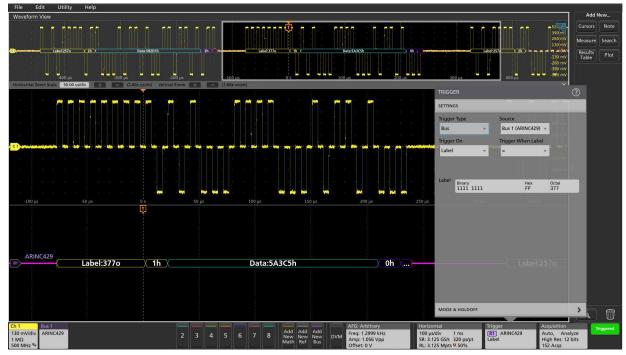
Bus trigger and search options

Characteristic	Description
Trigger and/or Search	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)

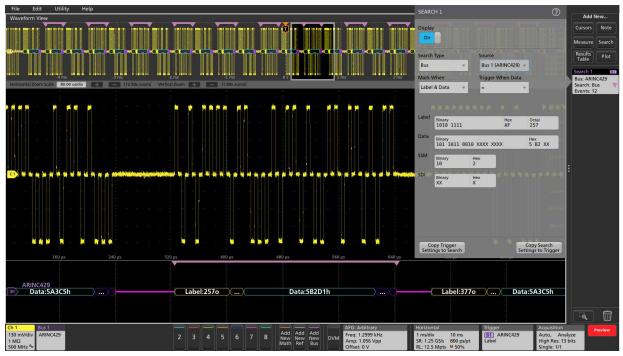
Bus decode

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 Clock, Word Select, Data)	Analog channels
	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

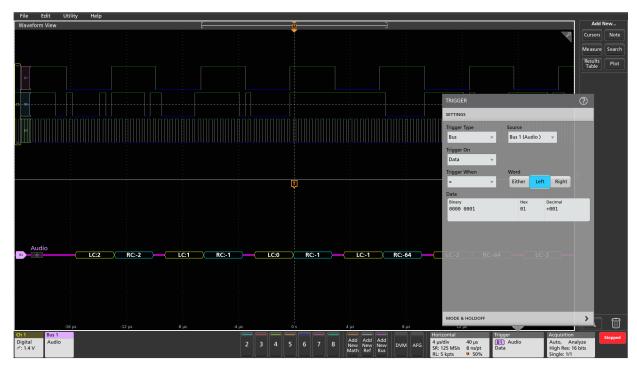
Bus trigger and search options

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)

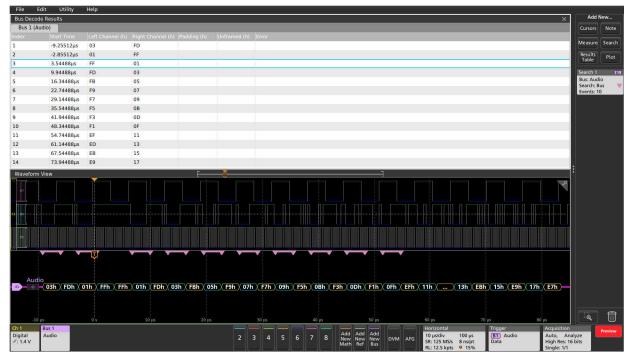
Bus decode

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

Characteristic	Description
Trigger On	Sync
	Reset
	Suspend
	Resume
	End of Packet
	Token (address) Packet

Characteristic	Description
	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)

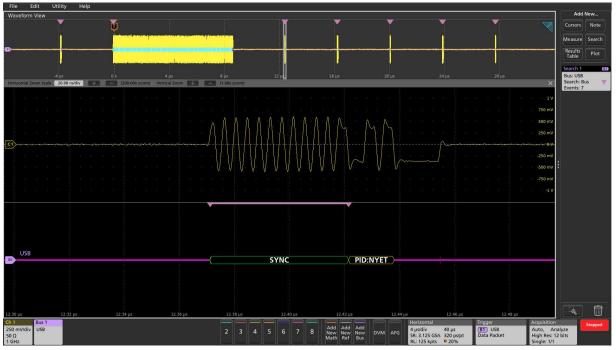
Bus Search options

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 3.0 Characteristics (Version 3.0)

Bus setup options

Characteristic	Description
USB 3.0 Source(s)	Analog channels
	Digital channels
	Active Math channels
	Active Reference channels
Thresholds	Per-channel thresholds
Speed	USB 3.0 (5 Gbps)
Recommended Probing:	
USB 1.0, USB 1.1, and USB 3.0	Single-ended
	Differential
Formats Available for USB 3.0	Hex
	Binary
	Mixed Hex
Packet View for USB 3.0	On
	Off

Display modes

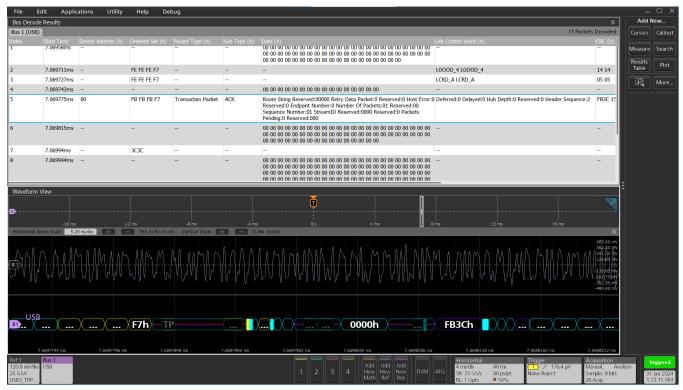
Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Table continued	

Table continued...

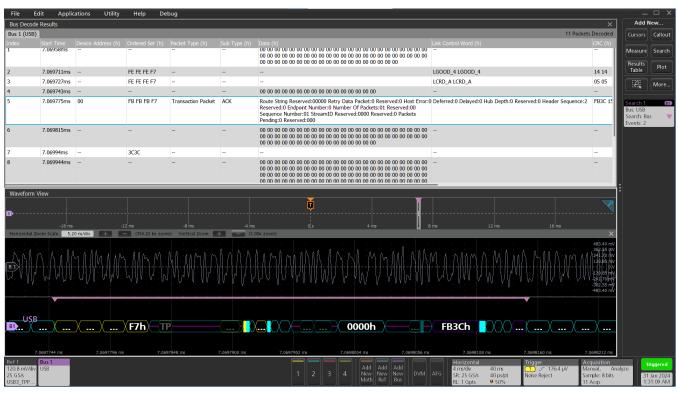
Characteristic	Description
Results Table	Decoded packet data in a tabular view

Bus Search options

Characteristic	Description
Search On	Packet View On Only
	Ordered Set: 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
	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

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

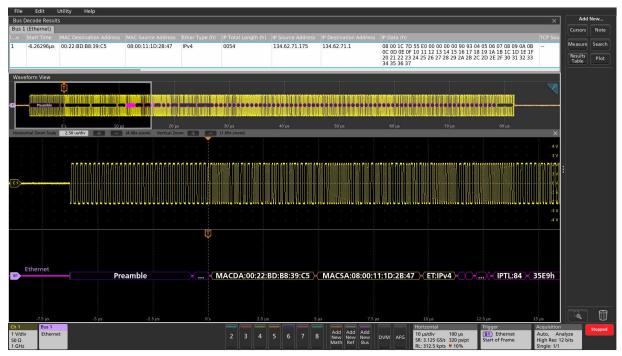
Characteristic	Description
Trigger On	Start Frame Delimiter
	MAC Addresses
	Q-Tag Control Information
	MAC Length/Type
	IPv4 Header
	TCP Header
	MAC Data
	TCP-IPv4 Client Data

Characteristic	Description
	ldle
	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
	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

F	ile Edit	Utility Help									
В	us Decode Resu	its							×	Add N	ew
	us 1 (Ethernet)									Cursors	Note
1	< Start Time -635.1746r	MAC Destination Address s 00:22:90:ED:45:C5	MAC Source Address 08:00:11:FF:01:CA	Ether Type (h) IPv4	IP Total Length (h) 0054	IP Source Address 134.62.74.162	IP Destination Address 134.62.74.1	(P Data (h) 08 00 17 A2 06 A3 00 00 6B 0B 6E AF 00 00 00 00 00 00 00 00 00	TCP 50	Measure	Search
		5 00122.50125.105125	00.00.11.11.01.01		0004	134.02.74.102	194.01.74.1	00 00 00 00 00 00 00 00 00 00 00 00 00		Results Table	Plot
2	9.604915µ	00:22:90:ED:45:C5	08:00:11:FF:01:CA	0088			-	-		Search 1	81
										Bus: Etherr Search: Bu Events: 6	net
3	19.84485µ:	00:22:90:ED:45:C5	08:00:11:FF:01:CA	0054	-	-					
4	30.08472µ:	00:22:90:ED:45:C5	08:00:11:FF:01:CA	IPv4	0054	134.62.74.162	134.62.74.1	$\begin{array}{c} 08 \ 00 \ 17 \ A2 \ 06 \ A3 \ 00 \ 00 \ 6B \ 0B \ 6E \ AF \ 00 \ 00 \ 00 \ 00 \ 00 \ 00 \ 00$			
5	40.32477µ	00:22:90:ED:45:C5	08:00:11:FF:01:CA	IPv4	0054	134.62.74.162	134.62.74.1	-	0		
6	50.56483µ	00:22:90:ED:45:C5	08:00:11:FF:01:CA	IPv4	0054	134.62.74.162	134.62.74.1	-	2048		
									-		
W	aveform View										
-											
Ĥ	onzontal Zoom Scal	250.00 ns/div	(40.00x zoom) Vertical Zo		(1.00x zoom)	40.45	50.05	oo jaa	×		
1	n n I			1 N F	1 1 1 1 1 1 1	n hin	<u>n n n n n</u>		2 V 1 V		
C	┝┍┙┝╽┝┑┝	╕╶╞╌╞┑╞╌╌┥╞╌╌╌┆╞╕╒╴╞ ┑╶╞	╌┝╌┥┝╌┑	الوالوسواليو	⊳,,,,,,,,,,,,,,,, ,,,,,,,,,,,,,,,,,,,,	بالبيولوم لريولم	┓┛╘┑╒╌╵╘╌╴╸╞╘┑┝╴┝╴┝┝	┷┱┲╍┙┺╴┲┉╘╾╸┢┙┺╗┙┛╕┙┛╞╴╛┶╸┍┠╕╛╘╍┱┉╍┙╘╶╶┙╘┑	- 6-V		
	┙╹╹╹	0.75 µs 31 µs	31.25 µs		.50 μs	31.75 µs	32 µs	32.25 μs 32.50 μs 32.75 μs			
4	<u> </u>										
B	Ethernet	MACDestAddr:00:22:9	0:ED:45:C5 MAC	Src Addr:08:0	0:11:FF:01:CA	ET:IPv4		PI:0000h 0000h 64 9989h 134.62.	74.162		
											M
Ch	1 Bus 1						n émen r	Horizontal Trigger A	Acquisition		Stopped
50 50 1 0		let			2 3 4	5 6 7 8	Add Add Add New New New I Math Ref Bus	DVM (AEG SR: 3.125 GS/s 320 ps/pt Start of Frame H	Auto, An High Res: 1 Single: 0/1	alyze	

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

SPMI characteristics¹ (Version 2.0)

Bus setup options

Characteristic	Description		
SPMI Sources (Clock	Analog channels		
and Data)	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

Description
Sequence Start Condition (SSC)
Reset
Sleep
Shutdown
Wakeup
Authenticate
Master Read
Master Write
Register Read

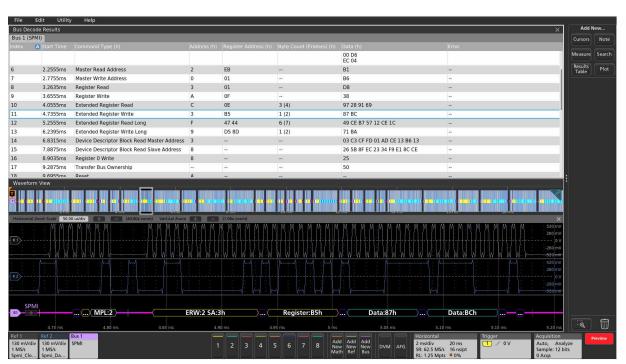
Characteristic	Description
	Register Write
	Extended Register Read
	Extended Register Write
	Extended Register Read Long
	Extended Register Write Long
	Device Descriptor Block Master Read
	Device Descriptor Block Slave Read
	Register 0 Write
	Transfer Bus Ownership
	Parity Error

Bus 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

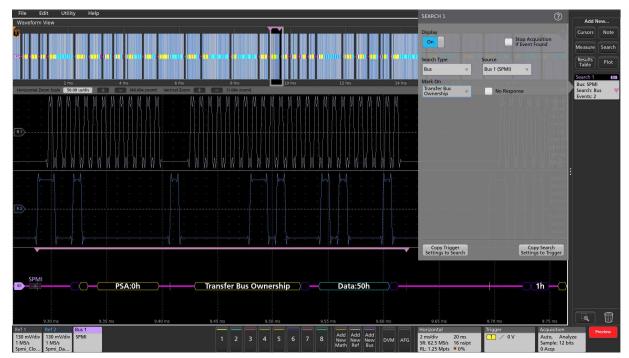
Bus decode

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
	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		(?)		
Wavef	orm View														Add I	New
	, 🛱											Display		Stop Acquisition	Cursors	Note
A												On		Stop Acquisition if Event Found	Measure	Search
R 1												Search Type	Source	And the second second	Results Table	Plot
			–									Bus	▼ Bus 1 (Space)	Vire) 🔻		
	0 s		100 µs	200 µs	300 µ	s (2.40x zoom)	400 µs	5 2 2	500 µs		600 µs	Mark On	800 µs	900 µs -2 V	Search 1 Bus: Space	eWire
Horizoi	ital zoom sc	cale 2.00 us/div	÷	— (50.00x zoom) Verti	cal zoom	(2.40x 200m)		-			-	Control Code	•		Search: Bu Events: 1	us 🔻
												Control Code Type		625 mV 416.667 mV		
												Time Code	v . 100 100 10	208.333 mV		
R 1												Time Code		0 V -208.333 mV		
												Binary XX XXXX	Hex XX	416.667 mV		
												State State		-625 mv -833.333 mV		
		108 µs		110 µs	112 µs	114 µs		116 µs		18 µs	. 120	μ		124 ps -1.041667 V		
												1.10		625 mV		
														416.667 mV		
R 2												-				
														-208.333 mV		
														-625 mV		
														-833.333 mV		
							-									
												100				
B1)	paceW	^{/ire} Data:5l	Fh	χχ	ESC:7h		X	Time	e-Code:	3Ch		Copy Trigger	X X F	Copy Search		
		Datais		/	2.5 0.771				, could.			Settings to Search		Settings to Trigger		
															ا الله	
Ref 1	Ref 2								Add	Add		Horizontal	Trigger	Acquisition		Auto
500 mV 104.536	1 104.5		e							New New Ref Bu		G SR: 1.25 GS/s	1 ms 1 🖊	Sample: 12 bits	alyze 18	8 Jun 2019
spacew	re space	ewire									<u> </u>	RL: 1.25 Mpts	9 5.9%	2.575 kAcqs	3:1	26:41 AM

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

File	Edit Appli	ications Utility	Help											Tektr	
	de Results												×	Add N	ew
Bus 1 (Sp				()										Cursors	Note
Index		Control Character (h)	Control Code (h)	Data (h)	Error										
7	177.9241µs	FCT FCT FCT FCT FCT FCT FCT FCT												Measure	Search
		FCT FCT FCT FCT FCT FCT											'	Results Table	Plot
8	213.2803µs			89 C4 CD 17 D8 D9 32											
9	258.1069µs	EOP			-										
10	260.001µs	FCT FCT FCT													
11	267.5773µs	-		5A 72 86	-										
12	287.1495µs	EOP		-	-										
13	289.0436µs	FCT FCT			-										
14	294.0945µs			97 71	-										
15	307.353µs	EOP			-										
16	309.2471µs	FCT FCT FCT FCT		-	-										
Wavefore	n View														
: :	ŭ												∇		
*	T interest														
. · ·													-1 V		
1.1	0 s	100 µs	200 µs	300 µs		0 µs	500 µs	600 µ	د د	700 µs	800 µs		900 µs -2 V		
Horizonta	I Zoom Scale 2.	00 us/div + -	(50.00x zoom)	Vertical Zoom	(2.40x zoom)								×		
													625 mV 208.333 mV		
R 1>													-208.333 mV		
													-208.333 mV -625 mV		
													-1.041667 V		
													-1.041667 V 625 mV		
													208.333 mV		
R 2													-208.333 mV		
													-625 mV		
186 µs		188 µs		192 µs	104.00			198 µs	200 µs		202 µs	204 µs	-1.041667 V		
180 µs		168 µs	190 µs	192 hs	194 µs	140 hz		198 µs	200 µs		202 µs	204 µs	1011007		
4															
B1	aceWire F CT:4h	0h FCT	:4h 0h	FCT:4h	0h FCT:	4h (0h)	FCT:4h		FCT:4h) Oh (FCT:4h	0h F	CT:4h		
	FC1.411			<u></u>			FC1.4II		FC1.411		<u>rc1.411</u> /		C1.4m		
														i.a	
Ref 1	Ref 2	Bus 1								orizontal	Trigger		Acquisition		
500 mV/dr		SpaceWire					Add	Add Add	10	on zontan 00 µs/div 1 n		/ OV		nalyze	Auto
104.5361	104.5361						8 New I Math	New New Ref Bus	DVM AFG SE	2 1.25 GS/s 800) ps/pt		Sample: 12 bits	18.	Jun 2019
spacewire	spacewire									.: 1.25 Mpts 🛛 🖗 5	.9%		1.847 kAcqs	3:2	25:53 AM

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

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				

Display modes

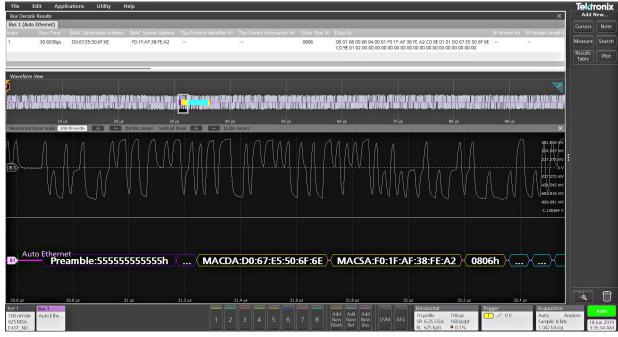
Characteristic	Description
Bus	Bus Only
Results Table	Decoded packet data in a tabular view

Bus search options

Description
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

Characteristic	Description
	End of Packet
	Frame Check Sequence (CRC) Error

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)



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



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

Bus decode

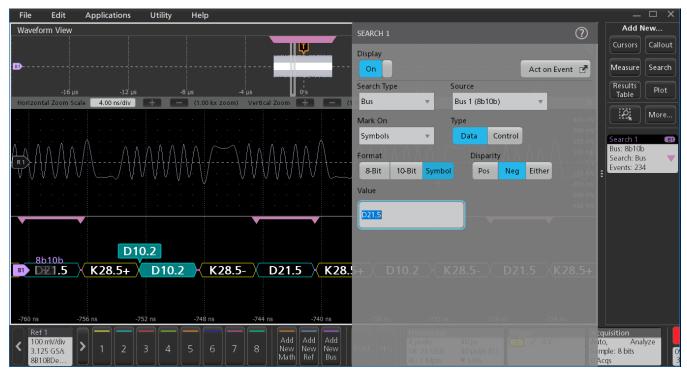
Characteristic	Description
Maximum Clock/Data Rate	1 Tbits/sec
Decode Display	Control Symbol (yellow packet) Data Symbol (cyan packet)
Error Handling	Invalid Symbols Running Disparity (6 bit and 4 bit)

Display modes

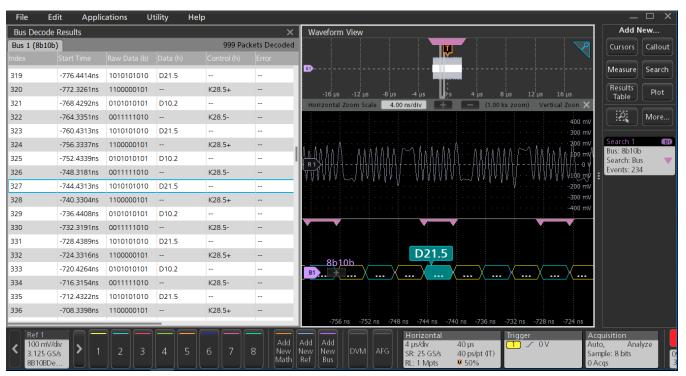
Characteristic	Description
Bus	Bus Only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Results Table	Decoded packet data in a tabular view

Bus search options

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



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

Bus setup

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
Table continued	1

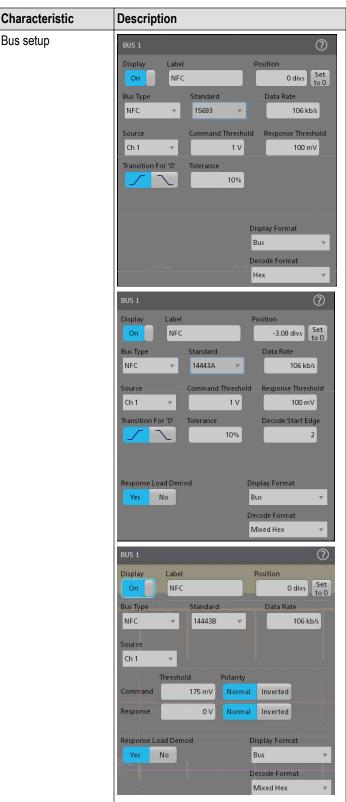


Table continued...

Characteristic	Description
	BUS 1
	Display Label Position On NFC 0 divs Set to 0
	Bus Type Standard Data Rate NFC v FeliCa v 212 kb/s
	Source Tolerance Ch 1 v 10%
	Threshold Transition For '0' Decode Start Edge
	Response 100 mV 🖊 🔪 1
	Display Format Bus
	Decode Format Mixed Hex
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

Characteristic	Description
	Information Flags
	VICC Memory Size
	• 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
	• BSt
	• BRt
	• BRS
	• BSi
	• BRi
	• DIDi

Charao	cteristic	;	Descrip	tion				Characteristic		Description
			 DID: FSL Gen NAE NAE nfcic nfcic 	eral Byte)i)t 12t 13t						 PPi PPt PFB Payload (Polling) TO Extra Data CRC Error Unframed
Bus Decode Bus 1 (NFC) Index 1	Start Time C -49.3056ms	Command Code (h) 26) UID (h) 	Data (h) 	66 Packets Decoc Parity (h) 	X Spectrum View		13.5t	60 MHz 2 dBm	Add New 6 dtm
2 3	-49.13885ms -	93			0010					-26 dBm Results Plot
4	-46.30107ms		 AE89056316	14 95 EC 08 44	11001	-				-36 dBm
6	-43.84868ms 9		AE89056316		010					
7		26			-	-				Bus: NFC
8	-40.00734ms				0 0	-				-56 dBm Search: Bus Verts: 33
9	-37.46652ms 9	93		 14 95 EC 08 44	10	•		MMA	M	
	-37.16955ms -	93	 AE89056316		100110000	-		WV I	MML INA	-76 dBm
12	-33.85673ms				010	I short wa	t. hahl	л. MAALN 👘 👘	- N. 171 W.	ANA an abush a than a should be
	-31.04259ms	26		-		- 网络秘密标准的秘密	WAND AND A	NWY 1 1 NY 1 1 1 1 1	- W W	AN YE WANNY PANYA II WANNAI INA AMARA COM
14	-30.87582ms				0 0		WK T			
15 16	-28.33501ms			 14 95 EC 08 44	10 11001	11.06 MHz				16.06 MHz
10	-25.58568ms	93	 AE89056316		100110000	Waveform View				•••••••••••••••••••••••••••••••••••••••
18	-24.72518ms				010	- BI-CMD	Y YY			
	-21.91108ms	26					-			
20	-21.74432ms				00		-20 ms		10 ms	
21 22		93		 14 95 EC 08 44	10	Horizontal Zoom Scale 203.25 us/	div +	(49.20x zoom) Vertical Zo	oom (+) (-)	(1.00x zoom) X
	-18.90654ms	93	 AE89056316	14 95 EC 08 44	100110000		titt			143.799 mV 107.849 mV
24	-15.59372ms				010					71.900 mV
	-12.77958ms	26				- MD CMD				35.950 mV
26	-12.6128ms				0 0					394.024 mV
27 28	-10.07199ms	93			10					295.518 mV
	-9.775037ms -	93	 AE89056316	14 95 EC 08 44	11001 100110000					197.012 mV 98.506 mV
30	-6.462237ms				010	OOK RSP				
	-3.648081ms	26				- NFC			16h	
32	-3.481303ms				0 0	- BI-CMD		Ar890563	TPN	
33		93			10	B1-RSP				6.504064 ns - 6.300812 ms -6.097560 ms
Math 5 1 V/div Bpskdems Bus 1	-643 5232000 Math 6 1 V/div 0 ^[coeffile Bus 1	Math 7 E 1 V/div 30*Math6 Bus 1		2	3 4 5			Spectrum CE: 13.5600000 MHz	Horizontal	Drms Trigger Acquisition Preview Drms V Manual, Analyze Preview Sample: 12 bits 19 Mar 2023

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.

3 Series MDO, 4/5/6 Series MSO Serial Triggering and Analysis Applications Datasheet

ile Edit Applications Utility Help									_ © >
pectrum View	× Bus Decode	Results						×	Add New
13.56 MH2/2	Bus 1 (NFC)							3 Packets Decoded	Cursors Callout
.854 dem n	Index 1	Start Time 25.72357µs	Command Code (h) REQB	Application Family Identifier (h) 00	Response Code (h)	Pseudo Unique PICC Identifier (h)	Number of Applications (h)	Bit Rate Capability (ł	Measure Search
	dBm 2	11.93318ms	Slot Marker						Results
	3	28.65533ms	Slot Marker	-		-	-	-	Table Plot
	4	45.37395ms	Slot Marker						
	dBm 5	62.09255ms	Slot Marker					-	More
	6	78.81116ms	Slot Marker						
	7	95.52978ms	Slot Marker					-	
	6 dBm	112.2493ms	Slot Marker						
	9	128.9679ms	Slot Marker						
	10	145.6865ms	Slot Marker						
	dBm 11	162.4051ms	Slot Marker				-		
	12	163.1635ms			Basic ATQB	9C013C96		80	
	13	173.5345ms	Slot Marker					-	
	dBm Waveform	Viow		[ŭ		1			
an an an Allandar an a'	waverorm	view		L Ų				<u>م کا المالی</u>	
and the second								200 1	
	5 dBm							-200 mV	
		0 s	20 ms	40 ms	80 ms	100 ms 120 ms	140 ms 1	00 mg	
and a state of the								188.814 mV	
	5 dBm							178.877 mV	
an a	Ξ							168.989 mV 159.002 mV	
	\rightarrow							· 155,002 mv	
	dBm M 7-R-SF							77.813 mV 25.988 mV	
an a	mh.							-25.988 mV -77.813 mV	
i han ann a' chuir bhan an a	Lea I	NEC							
	B1-CMD								
		-							
8.6 MHz 18.6 M	B1-RSP								
Ch 1 Math 1 Math 2 Math 3					Spectrum	Horizontal	Trigger	Acquisition	Preview
100 mV/div 4.968 mV/div 6.252 mV/div 1 V/div 10 dB/div Askdemo ^[coeffile 50*Fabs(^ >				Add Add Add New New New DVM	AFG Span: 10.0	00000 MHz 20 ms/div 200 0000 MHz SR: 250 MS/s 4 ns		Manual, Ana Sample: 12 bits	lyze
500 MHz Bw Bus 1 Bus 1 Bus 1				Math Ref Bus	RBW: 2.00			Single: 0 /1	

Result table for NFC 14443B

Bus Decode					×					×	Add New
Bus 1 (NFC)					3 Packets Decoded	N	↓ 13.007 MHz -49.7 dBm	13:13.559 MHz:3.702 MHz			Cursors Callout
Index		Command Code (h)	Response Code (h)	B24D	Payload (Polling) (h) Payload0:00 Payload1:FF Payload2:FF Paylo		-49.7 dBm	-4922.3 dBm 49.6 dBm		20 dBm	Measure Search
2				B24D	Payload Start Bit:01 NFCID2:05FE69C1197						
3	144.4999ms										Table Plot
										0 dBm	More
										-10 dBm	
										-20 dBm	
										30 dBm	
										-40 dBm	
										50 dBm	
						n h na chaile	ally has been a	La Marthan		-60 dBm	
						IN MARSON AN AN AN	JIR MAGAMAA AMLAMAA A	PLANT IT WARDAN AND AND AND AND AND AND AND AND AND	WW. WWW. WWW. WWW. WWW. WWW. WWW. WWW.	Kido, AREAN	
						Waveform View				'	
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						Horizontal Zoom Scale	40 ms 60 ms	80 ms 100 ms 120 ms		180 ms	
						Horizontal zoom scale	2.20 ms/div + -	(9.09x zoom) Vertical Zoom	(1.10x zoom)	× 5.455 V	
						C3	di dedite (fred ded Ϋ di	period and the period of the period	n pinini den despiratione	1.818 V	
						C 3	the part of the part of	adha laosadh caosa	a lipitoneta letteret no es	-1.818 V	
										-5.455 V -9.091 V	
									the second s	2.083073.V	
										1.986186 V 1.889299 V	
										1.792412 V	
										1.695525 V	
						NFC					
						B1-CMD					
						B1-RSP					
						-0.6 ms -4.4 r	ms -2.2 ms 0is	2.2 ms 4.4 ms I	5.6 ms 8.8 ms 11 ms		

FeliCa decode with result table

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Description

uid4(Cyan Packet)

RFU(Yellow Packet)

afi1(Yellow Packet)

PARAM(Yellow Packet)

Param1(Yellow Packet) Param2(Yellow Packet)

responseCode(Yellow Packet)

Characteristic

Bus decode

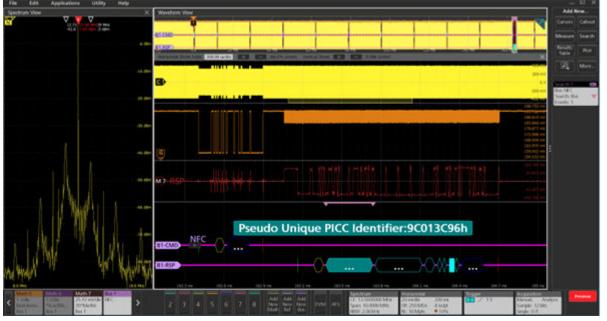
	-	Characteris
Characteristic	Description	
Maximum Data Rate	Max data rate for NFC Type B command is 1.7 Mbps	
Result table	SOF(Green Bar)	
	SOC(Green Bar)	
	SOS(Green Bar)	
	commandCode(Yellow Packet)	
	flag(Yellow Packet)	
	maskValue(Yellow Packet)	
	maskLength(Yellow Packet)	
	optionalAFI(Yellow Packet)	
	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)	
	length(Yellow Packet)	
	keylD(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)	
Table continued		Table continu

		•	Param3(Yellow Packet)
		•	Param4(Yellow Packet)
		•	INF(Yellow Packet)
		•	Data(Cyan Packet)
		•	Identifier(Cyan Packet)
		•	PUPI(Cyan Packet)
		•	APPDATA(Cyan Packet)
		•	attribInfo(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)
/ 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)
cket)		•	FSL(Cyan Packet)
		•	GB(Cyan Packet)
		•	NADi(Cyan Packet)
		•	NADt(Cyan Packet)
		•	nfcid2t(Cyan Packet)
	1		

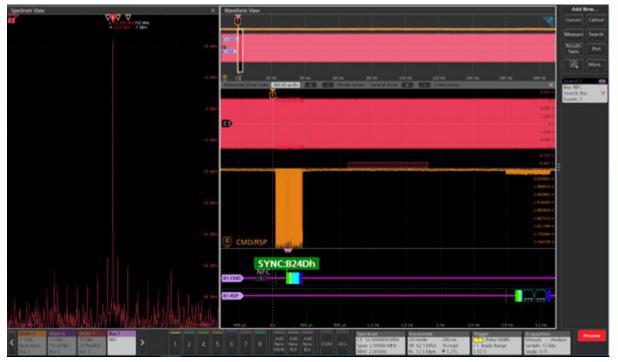
Table continued...

Table continued...

Characteristic	Description	Characteristic	Description
	nfcid3t(Cyan Packet)		EOF(Red Bar)
	nfcid3i(Cyan Packet)		• EOS(Red Bar)
	PPi(Cyan Packet)		
	PPt(Cyan Packet)	Bus Search	
	PFB(Cyan Packet)		
	 payload1(Cyan Packet) 	Characteristic	Description
	 payload2(Cyan Packet) 	Search ON	• SOF
	 payload3(Cyan Packet) 		• SOC
	 payload4(Cyan Packet) 		• SOS
	 payloadTSN(Cyan Packet) 		• Data
	 payloadBit(Cyan Packet) 		Payload
	NFCID2(Cyan Packet)		Command Code
	Pad(Cyan Packet)		Response Code
	RSP(Yellow Packet)		• UID
	SYNC(BusStart)		• AFI
	TO(Cyan Packet)		Identifier
	felicaData(Cyan Packet)		• PUPI
			• EOC
	• crc(Blue Packet)		• EOF
	EOC(Red Bar)		• 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 search options

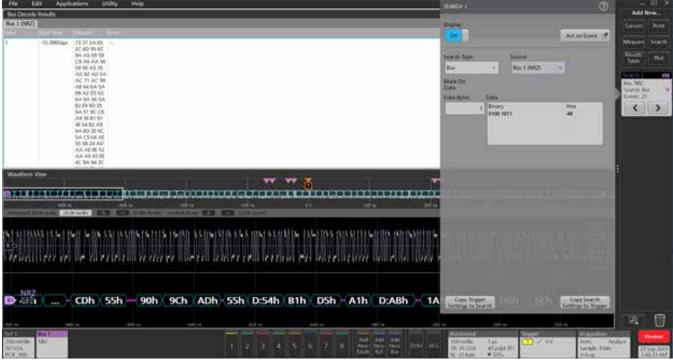
Characteristic	Description
Search On	Data Bytes [Maximum 5]

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



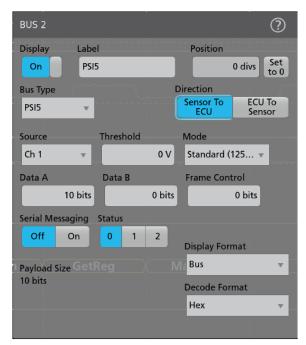
Searching on a specific data symbol in symbol format in the NRZ bus

	polications	Utility Help											Teltr	
lus Decode Results												×.	Abd N	- n
us 1 (NNZ)													Current	Note
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	29.46 AA												Table	Not
	AD 92 AD AC 71 AC	54											STOCK 1	
	A8.64.6A	54											Roc NRE Solarch: Ro	1
	199 A2 05 (6A 9A 56)	54											Date: 25	
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MA A					2 3 4			Bel Ste	912	10.656 80 (656)	1111 March 112	Sample Flats	135	Sep Jill

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

PSI5 characteristics (Version 2.1)

PSI5 Sensor to ECU configuration



PSI5 ECU to Sensor configuration

BUS 2			?
Display Label		Position	divs Set to 0
Bus Type PSI5 🔻		Direction Sensor To ECU	ECU To Sensor
Source Thr Ch 2 🔻	reshold 0 V	Sync Bit Peric	od i0 µs
Dulas Teeth	a Format bble Byte		
		Display Form Bus	at
		Decode Form Hex	load:01h hat

Bus setup options

Characteris tic	Description					
PSI5	Analog channels					
Sources	Digital channels					
	Active Math channels					
	Active Reference channels					
Thresholds	Per-channel thresholds					
Recommend ed 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					
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	Start [Start of packet] Status Data [Region B and Region A]			
Mark On	Direction -	Status			
	Sensor to ECU	Status			
		Data [Region B and Region A]			
		Block ID			
		Sensor Status [5 different status]			
		Errors [Parity CRC and any]			
	Direction - ECU	Start [Start of packet]			
	to Sensor	Status			
		Data [4 or 8 bits]			
		Function Code			
		Sensor Address			
		Register Address			
		CRC Error			



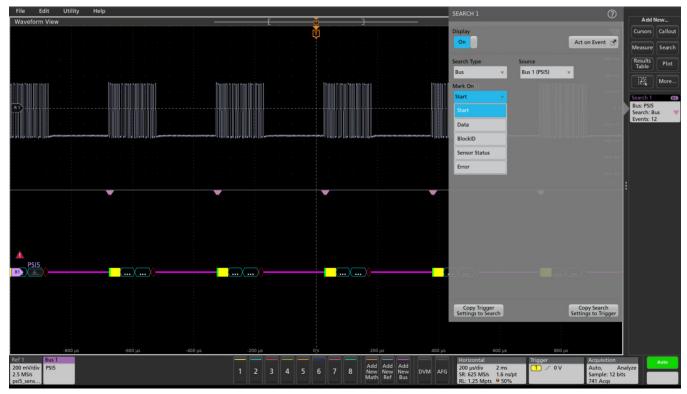
Note: Bus Search option is depend on the direction in Bus Configuration.

Bus decode

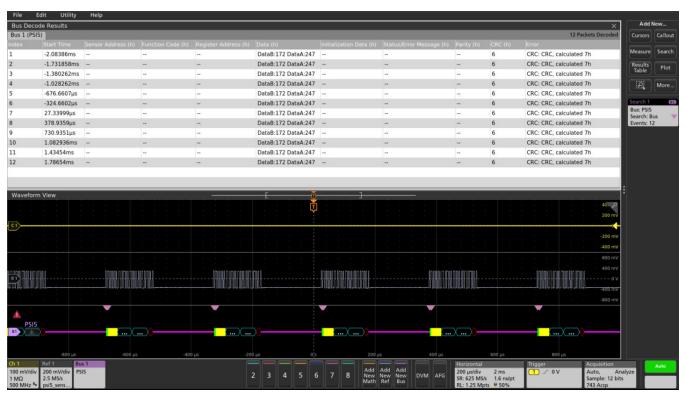
Characteristic	Description				
Decode Display	Direction - Sensor to ECU	Message Field (Yellow Field)			
	Packets	Status (Yellow Field)			
		Frame Control (Yellow Field)			
		Data B (Cyan Field)			
		Data A (Cyan Field)			
		Parity or CRC (Purple Field)			

Table continued...

Characteristic	Description	
	Direction - ECU to Sensor Packets	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)



PSI5 Search configuration

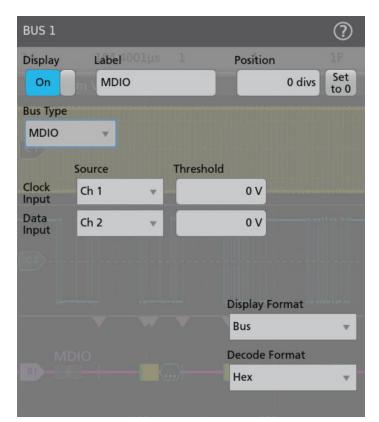


PSI5 Results table

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

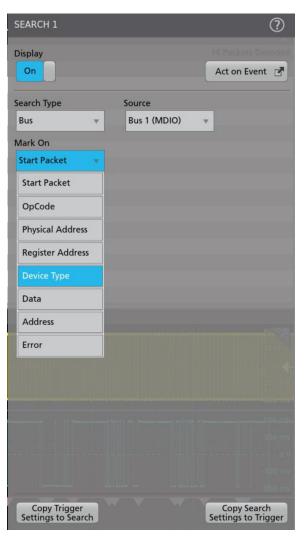


Bus configuration

Bus search options

Characteristic	Description
Search On	Start Packet
	OpCode

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



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

Bus decode	
------------	--

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

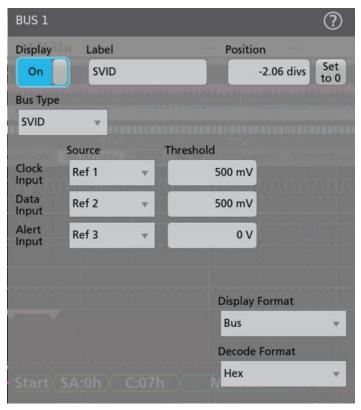
Characteristic	Description
	Physical Address (Yellow)
	Register Address (Yellow)
	Device Type (Yellow)
	Data/Address (Cyan)
	Error: Any, OpCode Error,
	Device Type Error (Red)



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 configuration

Bus search options

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

Display			
On armed (b)	Emer	Act on	Event 🗗
			3.11958µ
earch Type	Sla source ty: Incorrect Pa		
Bus v	Bus 1 (SVID) 📼		
Aark On	Slave Pancy: Incorrect Pa		
Start 🔻			
Start			
Slave Address			
Slave Address			
Command			
Payload			
	Slave Parity: Incorrect Pa		

Search configuration

Display modes

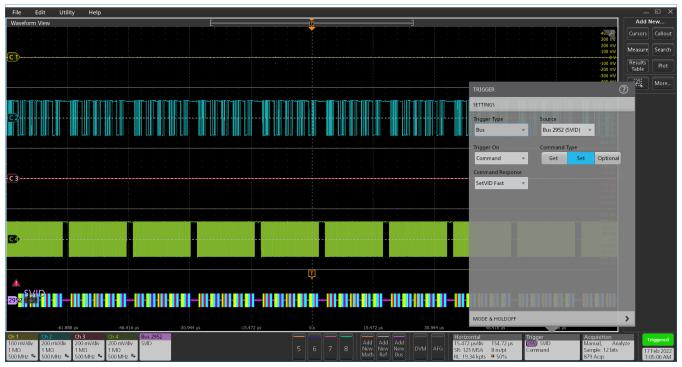
Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Result Table	Decoded packet data in tabular view

Characteristic	Description
Maximum Clock/Data Rate	Maximum frequency of 26.25 MHz
Decode Display	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)

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	114.500m	-	-		1	14		-				2		e packet; Linfo						
	138.5833m	12	-		1			-	-					r packet; Units					Table	e
	199.6425m		47		00	1				11		-	-			C. S. Service				
	1.214275/4					-		2	19	1		-						_		
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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

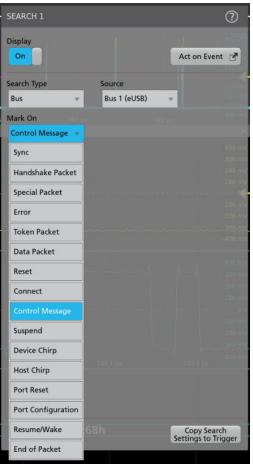
Characteristic	Description
Source(s)	Analog channels
	Digital channels(single-ended)
	Active Math channels
	Active Reference channels
Thresholds	Pre-channel thresholds
Speeds	Speed High Speed (480 Mb/s)
	Full Speed (12 Mb/s)
	Low Speed (1.5 Mb/s)
Recommended Probing, HS, LS, and FS	Single-ended [Active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

BUS 1						?
Display On	Label			Pos	ition 0 c	divs Set to 0
Bus Type		Spee	d	Ν	/lode	
eUSB	×.	Low	v (1.5 🔻		Native	Repeater
	Source		Threshold			
D+ Input	Ch 1	Ŧ		0 V		
D- Input	Ch 2	v		0 V		
BD-el						
				Disp	lay Forma	t
				Bus	8	
				Deco	de Forma	t
				Mix	ed Hex	

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 configuration

Bus decode

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)
	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)
Bus Decode Results	1

Characteristic	Description
	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
* Depends on the Model	simultaneously*
Upcoming Future addition	Timing Measurements for Protocols
Search Table	Displays the Search hits along with Delta time difference between hits

ST- Bus 2 (eUSB- PERPIPHERA									96 Packets Deco	oded Cursor	s Cal
art Time Packet Identifie	r (h) Address (d)	Frame Number (d)	Port (h)	End Point (h)	Start/Complete (h)	Start/End (h)	Start/Unused (h)	End Point Type (h)	Data (h)	CR Measu	e Sea
9.08332µs DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F	າ 🗖
8.67706µs DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F Table	° Pl
8.27081µs DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F	Mo
7.86456µs DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F	
7.45831µs DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F	
7.05206µs DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F	
6.6458µs DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F	
6.23956µs DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F	
5.8333µs DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F	
5.42707µs DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F	
4.84372µs										-	
5.92705µs										-	
1.2468µs DATA0									18 01 66 58 E6 17 A2 0A 6D 7F 8A	F	
••••••••••••••••••••••••••••••••••••••			1								
0,5 11 11 2	24 ps II (32.00x zoom)	44Ulas	672 s 10		Щбµз + Ш	1.120 /		H H1.568 ms	H 1/980 km b	×	
0,5 11 11 2				SYN			+ 10 1.344 ms 1		01 1/2016- 01	×	
0(5 81 11 2 cale 7.00 uz/div +				SYN PID:DA Data:1	TA0			■ (= 11.568 ms		×	
cost				SYN PID:DA Data:1	TA0			1 UL369 ms		×	
op UI 2 sole 7.00 uvdiv + HOSSIST DST-REPEATER	(32.00x zoom) \	Vertical Zoom	(1.00x zoom	SYN PID:DA Data:1	TA0						
op UI 2 sole 7.00 uvdiv + HOSSIST DST-REPEATER	(32.00x zoom) \	Vertical Zoom	(1.00x zoom	SYN PID:DA Data:1	TA0						
0/5 BI II 2 trate 7.00 tuXdiv + H25TST DST-REPEATER 686 µc	(32.00x zoom) \	Vertical Zoom +	(1.00x zoom	SYN PID:DA Data:1	TA0					×	

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 to 0 Bus Type Transition For '0' Data Rate Manchester Threshold Start Index Ref 1 Threshold Start Index Ref 1 Threshold I edge Tolerance Tolerance Off 1.2 bits 10% Display Format Bus Tolerance Display Format Bus Tolerance Tolerance Display Format Bus Tolerance Tolerance Display Format Bus Tolerance Tolerance Display Format Bus Tolerance Tolerance Display Format Display Format Threshold Tolerance Tolerance Display Format Tolerance Tolerance Tolerance Display Format Threshold Tolerance Tolerance Display Format Threshold Tolerance Tolerance Display Format Threshold Tolerance Tolerance Tolerance Display Format Threshold Tolerance Toleran
Recommended Probing	Differential/Single ended
Formats Available	Hex Binary
Packet View	BUS 1 Image: Constraint of the second se

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)

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

Characteristic	Description
Maximum Clock/Data Rate	1Gbps
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

Bus (decode
-------	--------

Character istic	Description	
Search On	Data	Mark On
(Packet View OFF)	Errors	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
* Depends on the Model	simultaneously*
Upcoming Future addition	Timing Measurements for Protocols
Search Table	Displays the Search hits along with Delta time difference between hits

Bus search options

Character istic	Description	
Search On (Packet View ON)	Sync Bits Header Data Trailer Errors	Mark On Sync Bits Sync Bits Header Data Trailer Errors
Table contin	ued	

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 ? Display Label Position On DPHY 0 divs Stop Bus Type Protocols Bkbb Encoding DPHY CS DSI Off Source Threshold OV Source Data Threshold LP Threshold D+ Ch 2 150 mV 1 V Input Ch 3 150 mV 1 V Decode Format Bus V Hex V V V
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 Formats Available	Select line encoding in LPDT and HS mode. Hex Binary Mixed Hex

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

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

SEARCH 1								?	
Display								coded	
On					Act on Event 🖪				
mplete packet(2); Unfran Search Type	ned: U	Inreco	verab						
Bus			1 (DP	 -		-			
Mark On									
SoT 🔹									
EoT									
m Data	ned: U								
Scrambling									
Compression									
Packets								4000	
BusTurnAround								200	
Escape								-200 mV -400 mV	
Stop								800 mV 400 mV	
Errors								0 V -400 mV	
]							-800 mV 800 mV	
								400 mV	
								-400 mV	
								800 mV	
				 				400 mV	

Bus search options

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	onnancodory
Upcoming Future addition	Timing Measurements for Protocols
Search Table	Displays the Search hits along with Delta time difference between hits

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

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



Bus search options



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			

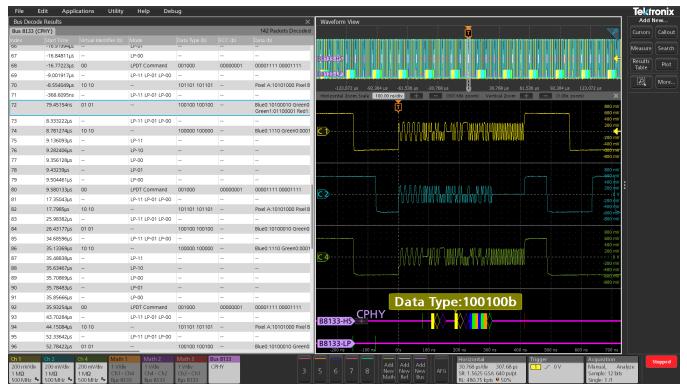
Bus decode

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

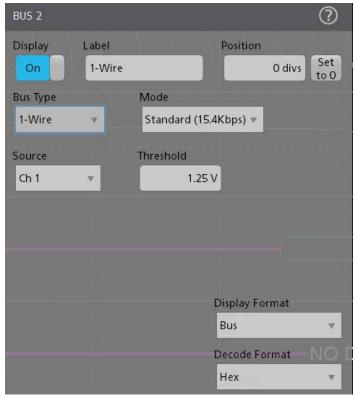


CPHY search results display

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	Single Ended passive probe			
Probing	Differential passive probe			



Bus setup

Display modes

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

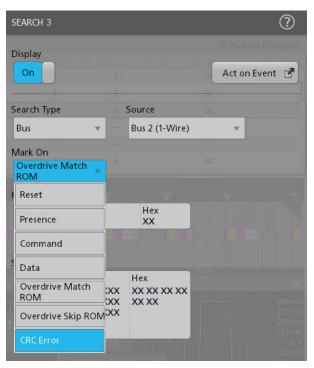
Bus decode

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 1		0
Display On		Act on Event 📑
Search Type	Source	
Bus 💌	Bus 2 (1-Wir	e) 🔻
Mark On		
Search ROM 🛛 🔻		× *
F Reset		
Presence	Hex XX XX XX XX XX	636.364 mV
Command		
	XX	272.327 mil
Data		WA LINA
Read ROM		
Match ROM		
Skip ROM		127.273 mV
Search ROM		353.636 mV
		181.818 mV
Alarm Search		
CRC Error		-181,818



Search on 1-WIRE

File E	dit Applic	ations Utility	Help Debug							_ © >
Bus Decod	Results								×	Add New
Bus 1 (1-Wi	e)								46 Packets Decoded	Cursors Callout
Index										
1	-1.291216ms	Reset:-1.291216ms								Measure Search
2	-775.2975µs	Presence:-775.2975µs	Search ROM	ROM Code:340000054A73910						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
7	1.060963s	Reset:1.060963s								Bus: 1-Wire Search: Bus
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 48 46 7F FF 08 10 51			
13	2.426812s	Reset:2.426812s		-						
14	2.427328s	Presence:2.427328s	Search ROM	ROM Code:340000054A73910						
Waveform	view									:
					📩					
BD					ROI	M Code:34000000	4A73910h	<u>"</u> +	N	
	-40 ms	-30 n		-20 ms -10 ms			10 ms 20 ms	30 ms	40 ms	
Horizontal Z		0 us/div	(25.00x zoom) Vert		419				X	
		· · · ·		and the second second second second second			an a	a a a la a a a	6.25 V	
					מה הב				5.V 3.75 V 2.50 V	
									2.50 V 1.25 V	
R 1		W W	لا لمسمال لسسها م	Kanadharadharadharadharadharadharadharadh	. إ احصاليها ا	السمېا اا اا		. الليمان _ الليمان _ الاستياب السبيا.	الل المسما استعما استعما استمار ال	
									1.25 V 2.50 V	
									3.75 V	
1-W	ire			Family Code:10h			Corial Numbe	er:00000054A739h		
							Serial Numbe	er.00000054A759h		
	15.6 ms	16 ms	16.4 ms	16.8 ms 17	1.2 ms	17.6 ms	18 ms	18.4 ms	18.8 ms 19.2 ms	
Ref 1	Bus 1								gger Acquisition	Preview
2 V/div 1 MS/s	1-Wire						dd Add Add . w New New DVM AFG	10 ms/div 100 ms SR: 12.5 MS/s 80 ns/pt	D ∠ 0V Auto, Ar Sample: 12 bits	nalyze
1-wire_10							eth Ref Bus	RL: 1.25 Mpts 950%	0 Acqs	12:53:58 AM

File E	lit Applic	ations Utility	Help Debug								SEARCH 1		(?)	— 🗆 X
Bus Decode	Results													Add New
Bus 1 (1-Wir)										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:340000005	4A73910						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 1	Number:0000005	54A739	2C	44				bus r (r wire)		More
5	1.022878s	Reset:1.022878s									-Mark On			
6	1.023387s	Presence:1.023387s	Match ROM	Family Code:10 Serial 1	Number:0000005	54A739	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:CE0000045	CFFBD28						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 1	10000045	5CFFBD	73	44			**			
11	2.11666s	Reset:2.11666s									Serial Number			
12	2.11717s	Presence:2.11717s	Match ROM	Family Code:28 Serial 1	Number:0000045	SCFFBD	73	BE	78 01 4B 46 7F	FF 08 10 51	Binary	Hex		
13	2.4268125	Reset:2.426812s									- XXXX XXXX XXXX XXXX			
14	2.427328s	Presence:2.427328s	Search ROM	ROM Code:340000005	4A73910						XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXX			
Waveform ¹	'iew													:
	·····						, 📠							
B)								M Code:3400000	4A73910h				N	
	-40 ms	-30 n		-20 ms					10 ms	20 ms	30 ms		15	
Horizontal Zo	om Scale 400.0		(25.00x zoom) Vert		(1.60x zoom)								×	
													6.25 V	
						1 1	וו ו וו	ا البينا ليب	ויייןויייןו	<u>, </u>			3.75 V	
													2.50 V	
R 1			. الېسا المنعا ل	بالسالساليبا	سيوليسمو _ الالس		المسالسيا .	لىمنبا ا ا		luwelf l	raal laad kaad baa		and and and and the	
													1.25 V 2.50 V	
	<u> </u>												_	
											Copy Trigger		Copy Search	
1-W	re		latch ROM	Family	C 1 10				C i-	l Nixura la a	Settings to Search		Settings to Trigger	
B1 + +			natch ROM		Code: Tu				Seria		r:00000054A7	sen		
			16.4 ms					17.6 ms					19.2 ms	
Ref 1	Bus 1			Ē							Horizontal	Trigger	Acquisition	Preview
2 V/div	1-Wire					4			dd Add Add ew New New	DVM AFG	10 ms/div 100 ms	<u> </u>		alyze
1 MS/s 1-wire_10									ath Ref Bus		SR: 12.5 MS/s 80 ns/p 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.		

Display modes

Characteristic	Description
Bus	Bus only
Result table	Decoded packet data in a tabular view with columns containing:
	Start
	Frame type
	Frame ID
	PTYPE ID
Table continued	1

Characteristic	Description
	• Sleep
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	StartFrame

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

File I	Edit Applicatio	ns Utility	Help									
Bus Decod	e Results									×	Add	New
Bus 1 (CXP)	I)									20 Packets Decoded	Cursors	Callo
	Start Time	Frame Type				Sleep (h)		DLC (h)	Ext DLC (h)	Data (h)		
1	13.08841ms	Normal Polling	00	04	1	1	0	6		64 07 C6 9D 51 63	Measure	Searc
2	57.75939ms	Long	-	52	0	1	0	F	26	09 F9 15 63 82 FF E2 16 DF A2 9B 16 D7 4B 41 85 81 DF F4	Results Table	Plot
3	199.0121ms	Long Polling	00	38	0	1	1	F	ЗD	7E 17 6F A1 B7 68 45 AE CD / E5 3A 5C 0D EB 55 3A F8 FD 6 2D 95 6E D3		More
4	410.5061ms	Normal Polling	00	15	3	1	1	С		CC ED D2 E6 7B 39 E7 85 B6 7		
5	472.7374ms	Normal Polling	00	64	3	1	1	7		C7 7F 8D 05 BC 0C 9F	Search 1 Bus: CXPI	
6	520.3351ms	Long		4C	0	1	1	F	03	8E 4A 01	Search: Bus	•
7	559.1527ms	Normal Polling	00	31	0	0	1	6		E8 4E CA 6E 88 61	Events: 20 Search 2	
8	603.8237ms	Long	-	09	0	1	0	F	41	43 F4 E4 24 4E 6E C5 95 37 Ai F1 FA ED 7E 39 11 8B 85 29 94 7B 86 A6 1F 8A 06 C9	Bus: CXPI Search: Bus Events: 3	•
9	824.0978ms	Normal		SF	2	1	1	6		5C F9 68 1C FD 73		
10	865.8421ms	Long Polling	00	01	0	0	0	F	4B	63 F5 C1 93 CC 4C 29 92 B7 5 45 98 6C 44 D7 A2 64 94 36 (
Waveform	View		(2.63x zoom) Vert	tical Zoom	(1.00x z							
R 1												
B1 11.4 ms))	30.4 ms			41.8 ms	45.6 ms		
Ref 1 125 mW/div 103.8706 kS TXPL demov			1 2	3 4 5	6 7	8 New N	dd Add ew New DVM lef Bus			Trigger Acquisit 1 ✓ 0 V Auto, Sample: 0 Acros	Analyze	Previe 09 Aug 3:37:21

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)

Characteristic	Description
Recommended Probes	It is a low speed protocol with voltage between 1.8 V-3.3 V
	1. Active Probes P7240
	2. TPP1500
	3. Low Voltage Single Ended Probes
Differentiators	 Protocol Search options (additional search options available under protocol decode):
	Start and End Events
	Wait States
	• Data
	 Errors – Invalid command type, Invalid cycle type, Fatal/Non-Fatal Errors.
	Decode formats in MIXED HEX.

Bus setup

Characteristic	Description
Single Mode (Default)	BUS 1 Image: Constraint of the second seco
Dual Mode	Display Format Bus Decode Format Mixed Hex BUS 1 ? Display Label On eSPI O divs Set to 0
	Bus Type I/O Mode Alert eSPI Single Dual Off Source Threshold Polarity SCLK Ch 1 OV Active Active High Low IO[0] Ch 3 OV Active Active High Low
	Display Format Decode Format Mixed Hex ¥

Display modes

Characteristic	Description
Bus	Bus only
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.

Table continued...

Characteristic	Description
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.
	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.

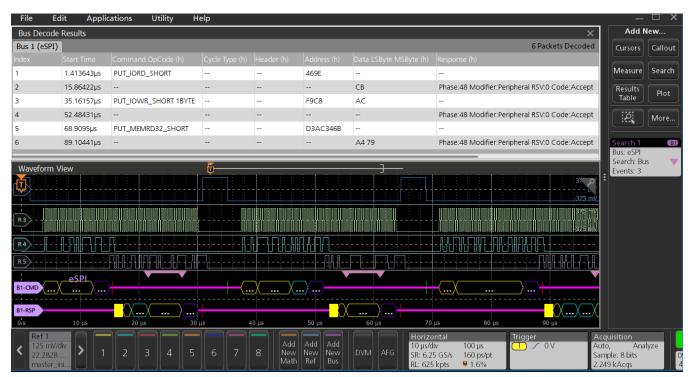
Characteristic	Description			
Search On eSPI	Length : Enables search on the length field for different channels based on different commands and response with header classified based on cycle types.			
	SMBus Slave Address: Enables search on SMBus Slave address under the OOB channel.			
	Virtual Wire 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 Bus Source Bus I (cSPI) Mark On Start Channel Independent Peripheral Channel OOB Channel Virtual Wire Channel Flash Access Channel Data			



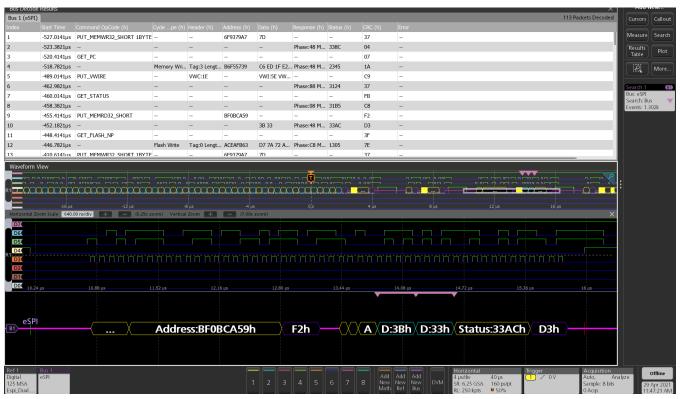
Table continued...

Characteristic	Description
Mark On and Channel Independent	SEARCH 2 ⑦ Display On Act on Event C
	Search Type Source
	Bus v Bus 1 (eSPI) v
	Mark On 200 mV
	OOB Channel
	Phase Command Response
	Tag Binary Hex XXXX X
	Length Binary Hex XXXX XXXX XXXX X X XX
	SMBus Slave Address XXXX XXX XX
	SEARCH 2
	Display On Act on Event
	Search Type Source
	Bus v Bus 1 (eSPI) v
	Mark On Virtual Wire Channel V
	Phase
	Command Response With Response Header Without Header
	Command Opcode
	PUT_VWIRE
	Virtual Wire Binary Hex Count XXXX XXXX XX
	Virtual Wire Binary Hex Index XXXX XXXX XX
	Virtual Wire Binary Hex Data XXXX XXXX XX
Table continued	

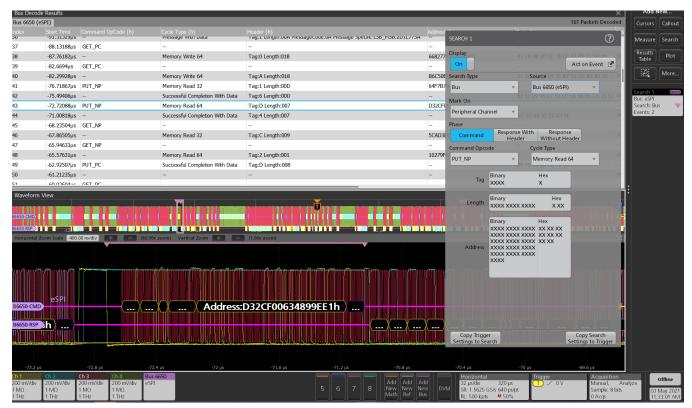
Characteristic	Description
	SEARCH 2 Display On Search Type Bus Search Type Bus Wark On Virtual Wire Channel Phase Command Response With Header Without Header Peripheral, OOB, and Virtual Wire Channel
Mark On and Channel Independent	SEARCH 2 Display Con Act on Event C Bus Command Source Bus Bus 1 (cSPI) Mark On Flash Access Channel Cycle Type Phase Command Response With Response Header Cycle Type PUT_FLASH_C Tag Successful Completion Tag Successful Comp



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)



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	y Help							-	ыx
Bus Decc	de Results							×	Add N	lew
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	
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	-			 Full-set	reen Shin	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		
Waveforr	n View									
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Digital 125 MS/s	eSPI				2 3 4		us/div 40 μs	Auto, Ana Sample: 8 bits	ilyze	
Espi_Dual							: 250 kpts 9 50%	0 Acqs		Aug 2022 58:44 PM
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	רם ⊂							^ ₪	ENG	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 Dipplay Format Bus V D- Input Ch 2 V OV D- Display Format Bus V Decode Format Hex V
Bus setup (Differential)	BUS 2 () Display Label Position On EtherCAT O divs Set to O Bus Type Signal Type EtherCAT Single 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

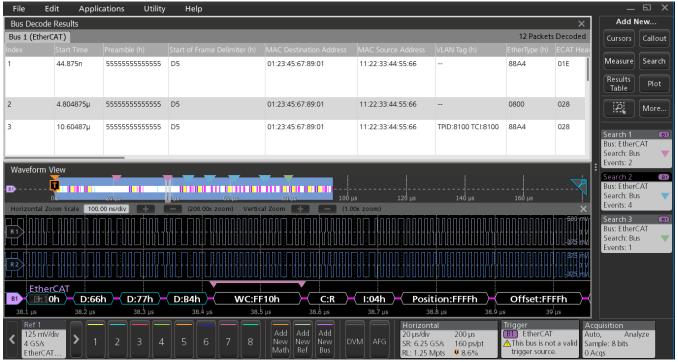
Display modes

Characteristic	Description			
Characteristic	Description Bus only			
Bus	,			
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.



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

File	DEMO	÷	ыx
Bus Dec	cu (Alturs	Add N	ew
Bus 1 (Et	 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, RS232 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 how the search badges. 		More
3	 Use zoom to navigate around the acquisition and look at how the serial data is decoded. 	earch 1 is: EtherC earch: Bu rents: 2	
Wavefor		arch 2	(6)
B)		is: EtherG earch: Bu: rents: 4	0/09/2
		earch 3 is: EtherC earch: Bu rents: 1	
R 2	Connection Details		
B1 Et	MISCELLANEOUS		
38.1 µs	SERIAL BUS		
Ref 1251		P	review
4 GS Ethe	Image: Spin (Section 1) Image: Spin (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 Image: Constraint of the second se					
Table continued	1					

Description Characteristic PEC Byte as True Label SMBus Display 0 divs Set to 0 On Bus Type PEC Byte SMBus Ŧ Source Threst SMBCLK Input Ch 1 οv w SMBDAT Ch 2 οv Ŧ Display Format Bus Decode Form Hex . 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			
Table continued				

Idle: Select to search on the idle events.

Characteristic	Description	Characteristic	Description
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		 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. 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.
Error Handling	Any, ACK, NACK		UDID Data: Sets the UDID data that you want to search.
Bus search options Characteristic Search On	Description Start: Select to search on the start events. Repeated Start: Select to search on the repeated start events.		 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.

Address: Sets the 7-bit address pattern that you want to search.

1

2

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10

B1

B1

Bus Decode Results Add New. Bus 1 (SMBus) 311 Packets Decoded -108.4425ms BlockWrite BlockRead Process Call Command 03 WR:0 AD 04 8D FC 7F -107.8005ms BlockWrite BlockRead Process Call Response 03 RD:1 13 C8 13 D6 -105.8765ms Host Notify Protocol Host Address:08 WR:0 Device Address:5. A4 6B -105.4725ms Write 32 37 WR:0 E4 FF 9E A4 F O, ---2F FF C5 E 77 D7 -104.9035ms Write 64 WR:0 ----103.9515ms 27 WR:0 16 Read 32 Command ---Bus: SMBus 27 RD:1 39 07 08 -103.7585ms Read 32 Response earch: Bus 3D WR:0 9E -103.2675ms Read 64 Command Events: 225 -103.0755ms 3D RD:1 ---OF 9E 9E C Read 64 Response -102.2325ms Prepare To ARP 61 WR:0 01 Waveform View *** ▲ ▲ ▲ 100.00 us/div Ҵѕӎ҅ҏҋ҉ӡҵӆӍ҅҅҅҅҅҅҅҅҅҅҅҅шҵ nradianth nnhhhnnn מממל השב ה הם מחוֹל ליתה לי היה המלול תכתול לי הנותם לולית מלי לי ממונים לי מכתול לי מברת לולוות ה A:77h CC:D7h D:2Fh D:FFh D:C5h D:EFh D:62h D:74h D:74h D:38h <u>ה אדורט ארו לךן הגראל איני אל אדי אל היה מאר אל ארו אלי אל ארו או א</u> U / / / / / / / / /

104.9 104.7 ms 104.5 m -104.4 m -104.3 m -104.1 m 104 8 m 104 6 m -104.2 m Horizontal 20 ms/div Trigger Acquisition Auto, / Preview Add New Math Analyze 250 mV/div 1 MS/s 200 ms 0 V < > Sample: 12 bits SR: 6.25 MS/s 160 ns/pt 획 100% 27 Aug 202' 5:13:06 AM 5MBus RL: 1.25 Mpts Acqs

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

File	Edit Applications Utility Help							
lus D	Decode Results					×	Add	lew
us 1	(SMBus)				311 P	ackets Decoded	Cursors	Callou
iex (DEMO					\bigcirc		
	ICCALLARS HINGWITE REQUIRED PROCESS CALL CONTINUES))))	UVVE D	AD1	64	1029FC7F	Measure	Searc
2	Summary • To debug a design problem, first you must know it exist	ts. This oscilloscope offers FastAcq. a f	ast waveform ca	apture mode car	bable of acquiring h	undreds of	Results	Plo
I	thousands of waveforms per second, radically increasing	g the amount of time the oscilloscope	is live and acqu	iring waveform	s. This demo illustra	tes how	Table	Pic
8	FastAcq's high waveform capture rate can find glitches	and other infrequent anomalies quick	dy and display t	hem with color-	grading or gray-sca	ile.	0	Mor
P	 Procedures Attach a TPP passive probe to Channel 1. 					10000000		IVIOI
	 Connect Channel 1 to the Rare Anomaly signal loop on : 	the DPO DEMO 3 board.				10000	Constant A	
	 Press the front panel Run / Stop button to start acquisit 				-		Search 1 Bus: SMBu	¢
	 The oscilloscope is set to display items with one second see are only occurring about one time per second yet th 		the intermitten	it anomalies as t	hey appear. The ru	nt pulses you	Search: Bu	
	 Explore the FastAcg Palette choices in the Horizontal co 						Events: 22	5
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						D:38h		
ľ	Connection					Recall Demo		
	Details					Session		
			111.5	EO. 20		1	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 .	*	*	v
SRAUDIO	Audio Serial Triggering and Analysis (I2S, LI, RJ, TDM). Enables triggering on packet-level information on serial audio buses.	 ✓ 	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	~
SRNET	Ethernet Serial Triggering and Analysis (10BASE-T, 100BASE-T). Enables decoding and analysis on Ethernet buses.	 ✓ 	V	~
SRI3C	I3C Serial Decoding and Analysis. Enables decoding and searching on packet-level information on MPI I3C.	 ✓ 	V	~
SRNRZ	NRZ Serial Decoding and Analysis. Supports NRZ with normal and inverted polarity with Bit order (MSB or LSB first).	 ✓ 	V	~
SRPM	Power Management Serial Triggering and Analysis. Enables triggering on packet-level information on SPMI buses.	 ✓ 	~	~
SRUSB2	USB 2.0 Serial Triggering and Analysis. Enables triggering on packet- level information on USB 2.0 buses.	~	~	~
SRUSB3	USB3.0 Serial Decoding and Analysis. Extensive search options.	×	×	V
SRMDIO	MDIO Protocol Decoder and Search. Extensive search options.	V	v	V
SRSVID	SVID Protocol Decider and Search. Supports version rev.1.92. Extensive search options	 ✓ 	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	~
SRETHERCAT	ETHERCAT Protocol Decoder and search. Enables decoding and analysis on EtherCAT buses.	×	V	~
SRSMBUS	SMBUS Protocol Decoder and search. Enables decoding and analysis on SMbus buses.	V	~	V
1 Year License		4-PRO- SERIAL-1Y	5-PRO- SERIAL-1Y	6-PRO- SERIAL-1Y
Perpetual Licens	e	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.	~	×	×
5-RI-125M	Record length enhancement to 125 million sample points.	×	~	×
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.	~	~	~
SRSPACEWIRE	SpaceWire serial analysis. Enables decoding and analysis on SpaceWire buses.	~	~	~
MTM		~	~	~
SRNRZ	NRZ Serial Decoding and Analysis. Supports NRZ with normal and inverted polarity with Bit order (MSB or LSB first).	*	~	~
DJA	Jitter Analysis Package including TIE, Eye diagram, Histogram and other advanced analysis measurements.	~	~	V
1 Year License Perpetual License		4-PRO- MILGOV-1Y	5-PRO- MILGOV-1Y	6-PRO- MILGOV-1Y
		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).

Serial bus type	3 Series MDO Option	4 Series MSO Option	5 Series MSO Option	6 Series MSO Option	Description
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.
Automotive 100BASE-T1	N/A	N/A	5-SRAUTOEN1	6-SRAUTOEN1	100BASE-T1 Automotive Ethernet serial analysis.
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, 3.1 (Gen 1, 2*), 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.

Serial bus type	3 Series MDO Option	4 Series MSO Option	5 Series MSO Option	6 Series MSO Option	Description
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	4 Series MSO Node-Locked/	5 Series MSO Node-Locked/	6 Series MSO Node-Locked/
	License ⁴	Floating License	Floating License	Floating License
MIL-STD-1553, ARINC 429	SUP3 SRAERO	SUP4-SRAERO SUP4-SRAERO-FL	SUP5-SRAERO SUP5-SRAERO-FL	SUP6-SRAERO SUP6-SRAERO-FL
I ² S, LJ, RJ, TDM	SUP3 SRAUDIO	SUP4-SRAUDIO SUP4-SRAUDIO-FL	SUP5-SRAUDIO SUP5-SRAUDIO-FL	SUP6-SRAUDIO 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

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
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
100BASE-T1 Automotive	N/A	N/A	SUP5-SRAUTOEN1	SUP6-SRAUTOEN1
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
Serial analysis bundle ⁵	SUP3 BND	N/A	N/A	N/A
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

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 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
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
SMBUS	N/A	SUP4-SRSMBUS	SUP5-SRSMBUS	SUP6-SRSMBUS
		SUP4-SRSMBUS-FL	SUP5-SRSMBUS-FL	SUP6-SRSMBUS-FL
NFC	N/A	SUP4-RFNFC	SUP5-RFNFC	SUP6-RFNFC
		SUP4-RFNFC-FL	SUP5-RFNFC-FL	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

Brief Description of Partner

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

Serial bus type	Minimum Bandwidth	Recommended Probes		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

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 type	Minimum Bandwidth	Recommended Probes		6 Series/6B Series MSO Option	Description
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.
12S	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
I3C	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

Serial bus type	Minimum Bandwidth	Recommended Probes	Ordering	5 Series MSO Option	6 Series/6B Series MSO Option	Description
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
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.

ASEAN / Australasia (65) 6356 3900 Belgium 00800 2255 4835* Central East Europe and the Baltics +41 52 675 3777 Finland +41 52 675 3777 Hong Kong 400 820 5835 Japan 81 (120) 441 046 Middle East, Asia, and North Africa +41 52 675 3777 People's Republic of China 400 820 5835 Republic of Korea +82 2 565 1455 Spain 00800 2255 4835* Taiwan 886 (2) 2656 6688 Austria 00800 2255 4835* Brazil +55 (11) 3759 7627 Central Europe & Greece +41 52 675 3777 France 00800 2255 4835* India 000 800 650 1835 Luxembourg +41 52 675 3777 The Netherlands 00800 0255 4835* Poland +41 52 675 3777 Russia & CIS +7 (495) 6647564 Sweden 00800 2255 4835* United Kingdom & Ireland 00800 2255 4835* Balkans, Israel, South Africa and other ISE Countries +41 52 675 3777 Canada 1 800 833 9200 Denmark +45 80 88 1401 Germany 00800 2255 4835* Italy 00800 2255 4835* Mexico, Central/South America & Caribbean 52 (55) 56 04 50 90 Norway 800 16098 Portugal 80 08 12370 South Africa +41 52 675 3777 Switzerland 00800 2255 4835* USA 1 800 833 9200

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

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