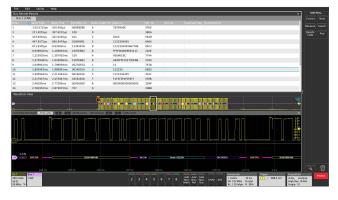
Tektronix[®]

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, LIN, FlexRay, 100BASE-T1, SENT, RS-232/422/485, UART, USB 2.0 (LS, FS, HS), Ethernet, I3C, SPMI, Spacewire, 8b10b, NRZ, MIL-STD-1553, ARINC 429, I²S, LJ, RJ, PSI5, CPHY, CXPI, DPHY, 1-WIRE, and TDM.

Key features

- Automated Serial Decode and Analysis Options for I²C, SPI, eSPI, I3C¹, CAN, CAN FD, LIN, FlexRay, SENT¹, RS-232/422/485, UART, USB 2.0, Ethernet¹, SPMI¹, MIL-STD-1553, ARINC 429, I²S, LJ, RJ, PSI5, DPHY, CXPI, CPHY, 1-WIRE, 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, LIN, FlexRay, 100BASE-T1, SENT, RS-232/422/485, UART, USB 2.0 (LS, FS, HS), Ethernet, I3C, SPMI, Spacewire, 8b10b, NRZ, MIL-STD-1553, ARINC`429, I²S, LJ, RJ, PSI5 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, LIN, FlexRay, SENT, RS-232/422/485, UART, USB 2.0, Ethernet, 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 \rightarrow arrow buttons on the oscilloscope front panel or the Search badge. The 3 Series MDO uses the arrows in the Search badge to navigate.

¹ Not available for 3 Series MDO.

I²C characteristics

Table 1: 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	Hex
Available	Binary

Table 4: Bus decode

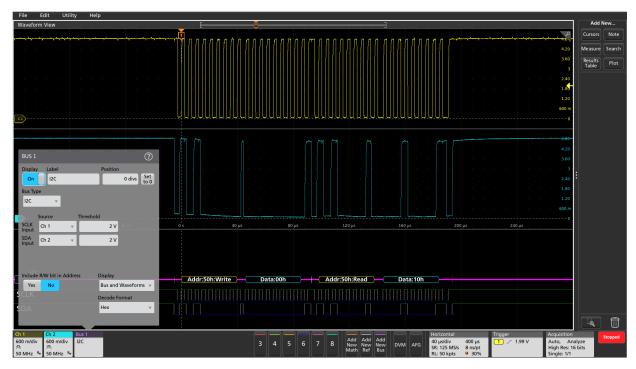
Characteristic	Description
Maximum Clock/Data Rate	Up to 10 Mb/s (automatic selection)
Decode Display	Start (green bar)
	Address (yellow packet)
	Data (cyan packet)
	Missing Ack (! symbol in red box)
	Stop (red bar)

Table 2: Display modes

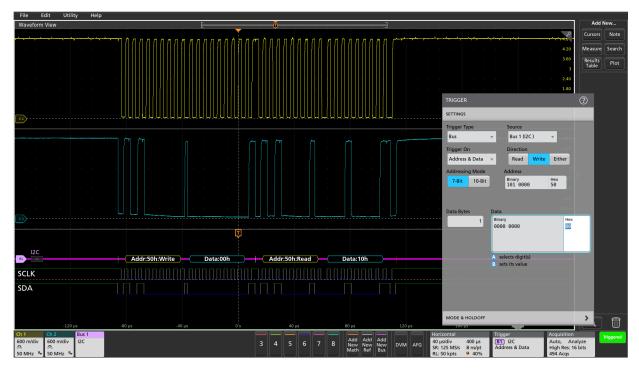
Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Results Table	Decoded packet data in a tabular view

Table 3: 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



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



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

SPI characteristics

Table 5: Bus setup options

Characteristic	Description
SPI Sources	Analog channels
(Clock, Data, and Slave Select)	Digital channels
Slave Select)	Active Math channels ¹
	Active Reference channels ¹
Thresholds	Per-channel thresholds
Recommended Probing	Single-ended
Decode Configuration:	Claure Calact (2 unite CDI), Idla Times (2 unite
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

Table 6: Display modes

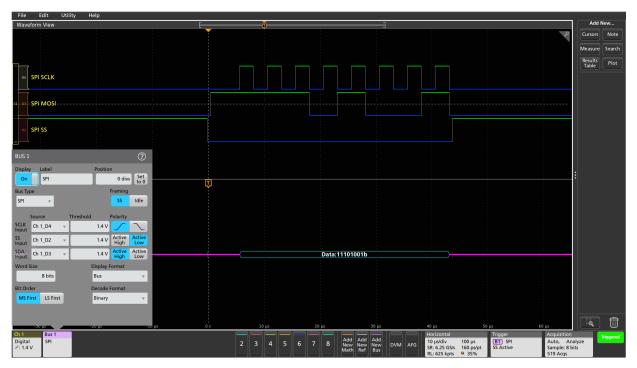
Characteristic	Description
Bus	Bus only
Bus and Waveforms	Simultaneous display of bus and digital waveforms
Results Table	Decoded packet data in a tabular view

Table 7: Bus trigger and search options

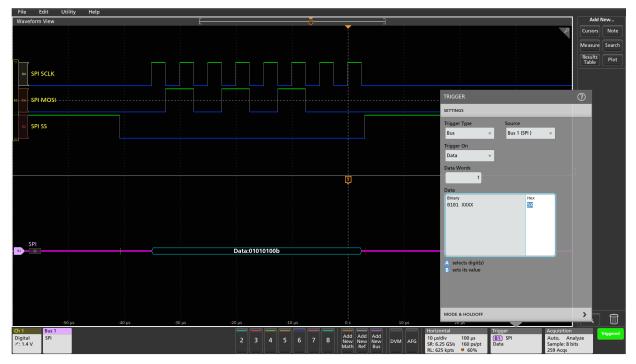
Characteristic	Description
Trigger and/or Search	SS Active (3-wire SPI)
V 11	Start of Frame (2-wire SPI)
	Data (1-16 bytes)

Table 8: 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)



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 (Version 1.0)

Table 9: 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

Table 11: 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

Table 12: Bus decode

Table 10: 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

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)



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.

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

Table 13: Bus setup options

Characteristic	Description
Sources, RS-232, UART	Analog channels
	Digital channels
	Active Math channels ¹
	Active Reference channels ¹
Sources, RS-422, RS-485	Analog channels
K5-400	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

Table 14: Display modes

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

Table continued...

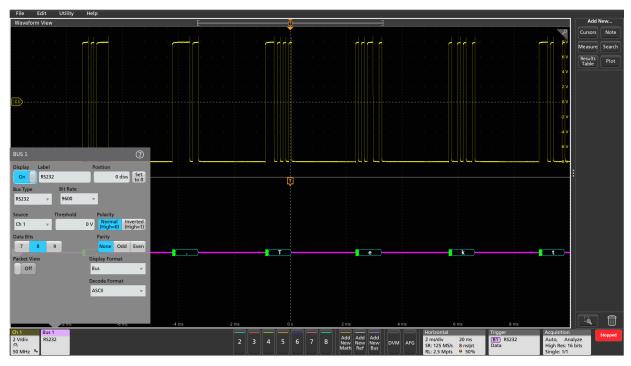
Characteristic	Description
Results Table	Decoded packet data in a tabular view

Table 15: Bus trigger and search options

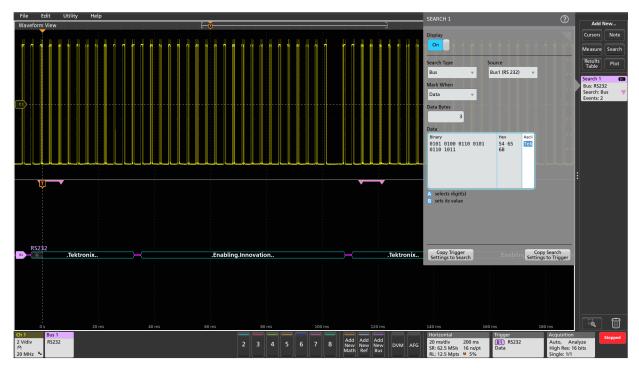
Characteristic	Description
Trigger and/or Search	Start
On	End of Packet
	Data (1 - 10 bytes)
	Parity Error

Table 16: 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)



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)

Table 17: Bus setup options

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

Table 18: Display modes

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

Table 19: Bus trigger and search options

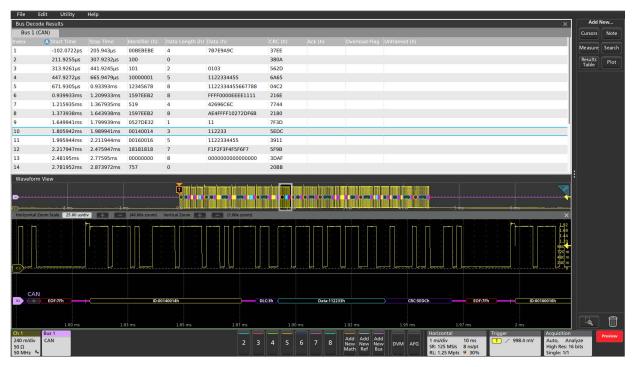
Characteristic	Description
Trigger and/or Search	Start of Frame
On	Type of Frame (Data, Remote, Error, Overload)
	Identifier (Standard or Extended)
	Data (number of bytes 1-8, trigger or search when =, \neq , <, <, >, ≥)
	Identifier and Data
	EOF
	Missing Ack
	Bit Stuff Error

Table 20: Symbolic bus search options

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

Table 21: Bus decode

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



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



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

CAN FD (ISO and non-ISO) characteristics

Table 22: Bus setup options

Characteristic	Description
Source for CAN_H, CAN_L, Rx, or Tx (single-ended probing)	Analog channels Digital channels Active Math channels ¹
	Active Reference channels ¹
Source for Diff	Analog channels
(differential probing)	Active Math channels ¹
	Active Reference channels ¹
Thresholds	Per-channel thresholds
Recommended Probing: CAN_H, CAN_L, Rx,	Single -ended Differential
or Tx Diff	
Version	ISO non-ISO
SD Bit Rate Selection: Predefined list of rates Custom	10 kb/s - 1 Mb/s All but 3 Series MDO: 50 kb/s - 10 Mb/s 3 Series MDO: 10 kb/s - 1 Mb/s
FD Bit Rate Selection: Predefined list of rates Custom	All but 3 Series MDO: 1 Mb/s - 16 Mb/s 3 Series MDO: 1 Mb/s - 7 Mb/s 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

Characteristic	Description
	Symbolic (.dbc) ¹

Table 23: 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

Table 24: 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)

Table 25: Symbolic bus search options

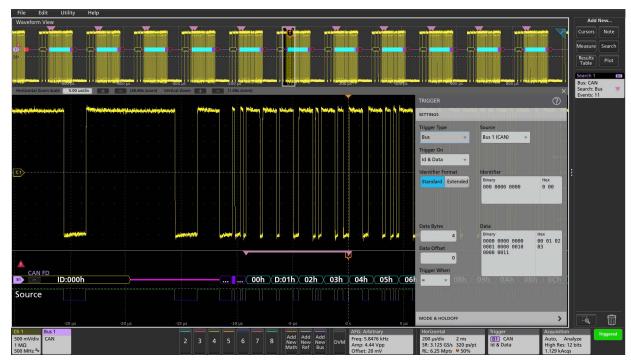
Characteristic	Description
Message	As defined by the .dbc file ¹
Message and Signal	As defined by the .dbc file ¹

Table 26: Bus decode

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)

Table 27: 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

Table 28: 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

Table 29: Bus trigger and search options

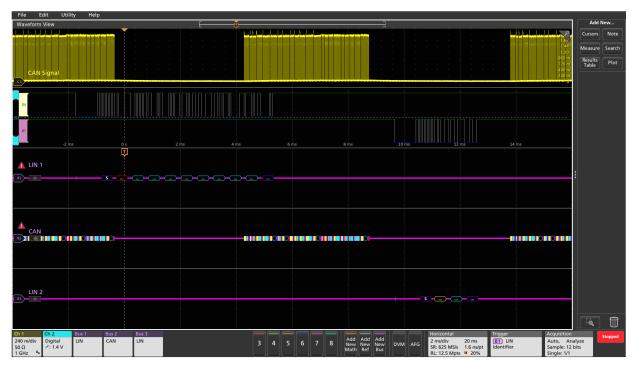
Characteristic	Description
Trigger and/or Search On	Sync
	Identifier
	Data (number of bytes 1-8, trigger or search when =, \neq , <, <, >, ≥, Inside Range, Outside Range)
	ID and Data
	Wakeup Frame
	Sleep Frame
	Error (Sync, ID Parity, Checksum)

Table 30: Bus decode

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 Ec	dit Utility	Help						(
Bus Decode							× Add	d New
Bus 1 (Ll							Cursors	s Note
	the second s	The second s	Contractor and the second s	b) Unframed (h) Data (h)	Checksum (h)	and the second se	Manur	e Searc
1		-100.3323ms		80 FF FF FF FF FF FF FF	80	Checksum: Checksum, calculated 07h		
2	-760.8545µs		00 10	2F 45 C3	90	Checksum: Checksum, calculated 2Fh	Results Table	F Plot
3	105.8623ms		01 11	1E AF 74 99 E2 45 8C 83	2A			
4	133.1646ms						- 1997	
5	212.5379ms		02 11	54 43 A8 2E C6 B6 81 2F	AO	Identifier: Parity		
6	319.2824ms		03 00	12 48 B1 16 14	C9	Checksum: Checksum, calculated FFh		
7		429.0045ms	04 11	3F	FB	Sync: Invalid sync field		
8	532.6003ms		05 10	98 1D E7	DC			
9	639.3519ms		06 00	67 23	6F			
10	746.0544ms	751.3855ms	07 01	DC 2C 34 8E E8	4B	Checksum: Checksum, calculated 04h		
Horizontal Zor	-160 ms om Scale 1.00 ms/d	v + -	s 10 (100.00x zoom) Vertie		800 ms	400 ms 500 ms 600 ms 700 ms	×	
			пппппп					
· B4								
B1 +		+	Sync	holh D:1Eh D:AFh Data:7	4h Data:99h)			
	15 ms	106 ms	107 ms	108 ms 109 ms	110 r			
	Bus 1 LIN			1 3 4	5 6 7		Analyze e: 12 bits	Previet

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)

Table 31: Bus setup options

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

Characteristic	Description
	Mixed Hex (Decimal: ID, Len, and Count; Hex: Data and CRCs)

Table 32: 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			

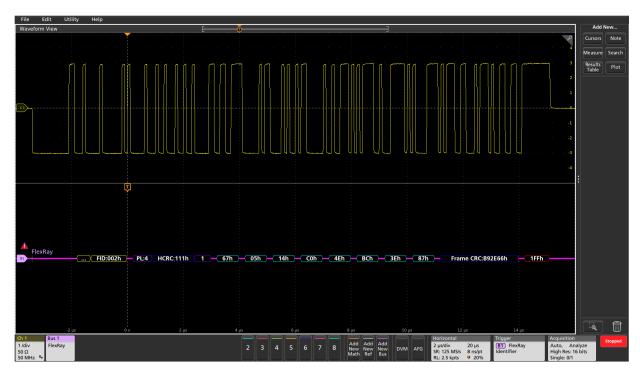
Table 33: Bus trigger and search options

Characteristic	Description
Trigger and/or Search On	Start of Frame
	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)

Table 34: Bus decode

Characteristic	Description
Maximum Clock/Data Rate	Up to 10 Mb/s (for automated decoding of bus)
Table continued	

Characteristic	Description
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

Table 35: 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				

Table	36:	Display	modes
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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

Table 37: 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)

Table 38: 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)

Table 39: Bus decode

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

File E	dit Utility	Help								
Bus Decor	le Results							×	Waveform View	Add New
Bus 1 (SEN	T)									Cursors Note
Index 🤇	Start Time									
44	-13.23838ms	01 00	B5E	4F5	В					Measure Search
45	-12.38638ms	01 00	2B2	4C9	5				Dia caranya ang aray aray arang arang arang arang ang ang arang arang arang ber ang arang arang arang arang ar	Results Plot
46	-11.53438ms	10 00	978	1A2	3		-		(07) D035 - (07) D035 D035 11 0035 -	Table
47	-10.68238ms	11 00	0EC	7FE	2					
48	-9.830377ms	10 00	694	4B2	3				-40 ms -30 ms -20 ms -10 ms 0's 10 ms 20 ms 30 ms 40 ms	
49	-8.978379ms	01 00	B66	3BF	3	07	075	01	Horizontal Zoom Scale 2.50 ms/div 😝 🧰 (4.00x zoom) Vertical Zoom 📑 💼 (1.00x zoom) 🗙	
50	-8.126378ms	10 00	95D	A54	С	Start			₽ 2.04V	
51	-7.274379ms	10 00	OBE	F4A	D					
52	-6.422379ms	10 00	E48	083	0					
53	-5.570378ms	10 00	41A	DCB	F				a de la companya da s	
54	-4.718377ms	10 00	5D8	FD7	F				ана на	
55	-3.866378ms	11 00	1F7	0E5	2					
56	-3.014378ms	00 00	3C1	3BC	0				\mathbb{C}^{m} . The second secon	
57	-2.162378ms	00 00	F08	3D5	5				1 -module constraints and the second π^{+} 340 π^{+}	
58	-1.310377ms	00 00	A97	4A9	F					
59	-458.378µs	00 00	F06	DFB	6					
60	393.6206µs	00 00	27F	C72	С					
61	1.245621ms	01 00	532	FB3	A					
62	2.097622ms	01 00	B5E	4F5	В					
63	2.949623ms	01 00	2B2	4C9	5		-			
64	3.801621ms	10 00	978	1A2	3		-			
65	4.653623ms	11 00	0EC	7FE	2		-			
66	5.505623ms	10 00	694	4B2	3					
67	6.357621ms	01 00	B66	3BF	3	07	075	01		
68	7.209623ms	10 00	95D	A54	С	Start				
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	ЗВС	0				-17.5 ms -15 ms -12.5 ms -10 ms -7.5 ms -5 ms -2.5 ms 0 s 2.5 ms	
Ch 1 340 mV/div 1 MΩ 500 MHz ^B *	Bus 1 SENT				2 3	4 5	6 7	8	Add Add Add Add Add Prey New	nalyze

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

Table 40: 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

Table 41: Display modes

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

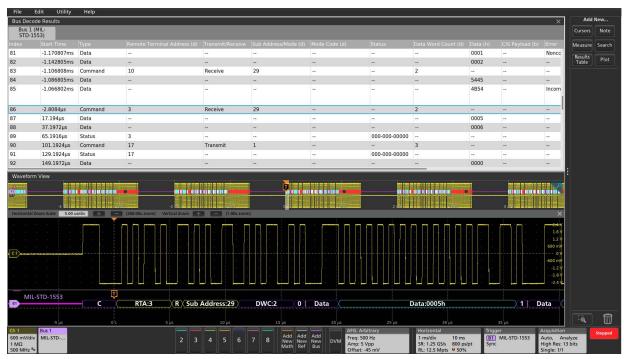
Table 42: Bus trigger and search options

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,

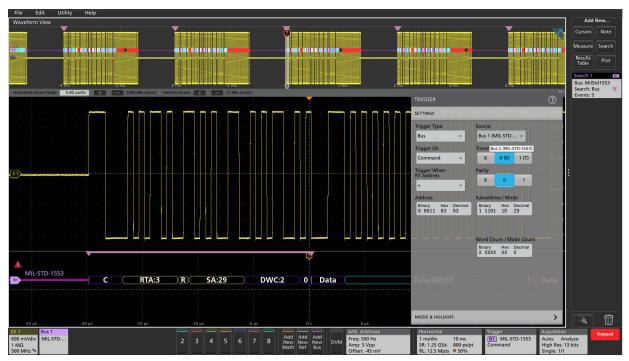
Characteristic	Description
	Bit 9 - Message Error,
	Bit 10 - Instrumentation,
	Bit 11 - Service Request,
	Bit 15 - Broadcast Command Received,
	Bit 16 - Busy,
	Bit 17 - Subsystem Flag,
	Bit 18 - Dynamic Bus Control Acceptance,
	Bit 19 - Terminal Flag,
	and Data =, ≠, <, ≤, >, ≥,
	Inside Range, Outside 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)

Table 43: Bus decode

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)

Table 44: 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

Table 46: Bus trigger and search options

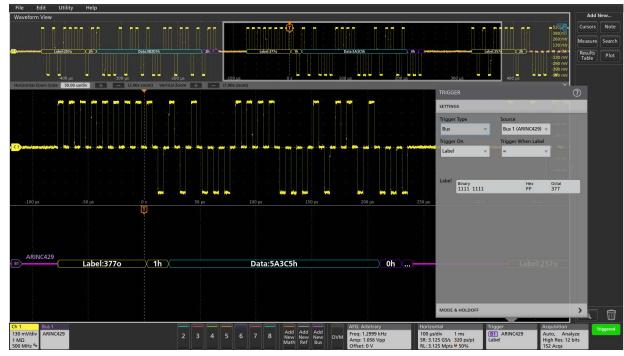
Characteristic	Description
Trigger and/or Search On	Word Start
	Label (when =, ≠, <, ≤, >, ≥, Inside Range, Outside Range)
	Data (when =, ≠, <, ≤, >, ≥, Inside Range, Outside Range)
	Label and Data (Label value and Data =, ≠, <, ≤, >, ≥, Inside Range, Outside Range)
	Word End
	Error (Any Error, Parity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

Table 47: Bus decode

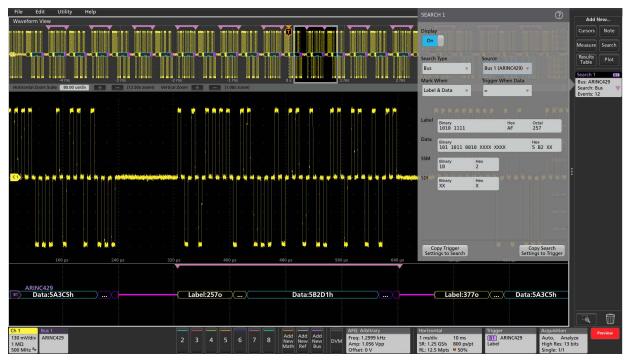
Characteristic	Description
Decode Display	Start (green bracket)
	Label (yellow box)
	Source Destination Identifier (yellow box)
	Data (cyan box)
	Sign/Status Matrix (purple box)
	Parity (purple box)
	Stop (red bracket)
	Error (red box)

Table 45: Display modes

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

Table 48: Bus setup options

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

Characteristic	Description
Results Table	Decoded packet data in a tabular view

Table 50: 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)

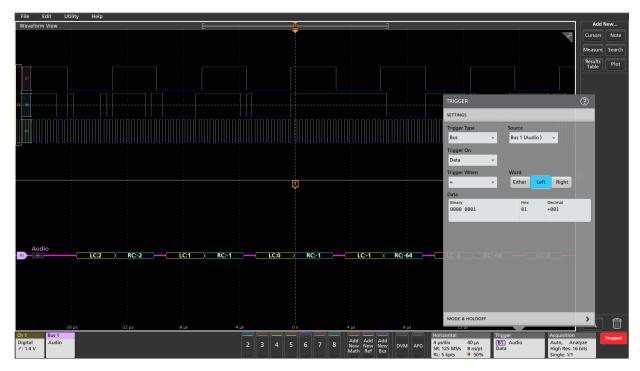
Table 51: Bus decode

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)

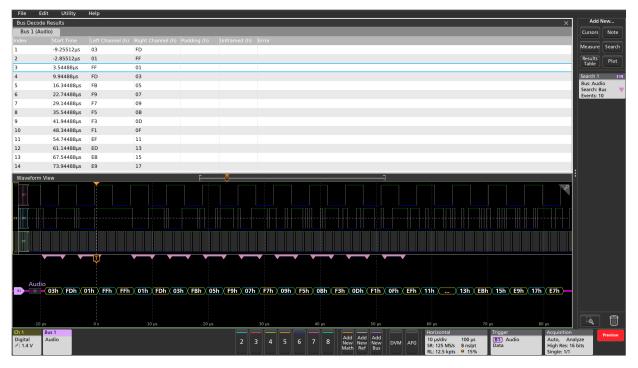
Table 49: Display modes

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)

Table 52: 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	High Speed (480 Mb/s)
	Full Speed (12 Mb/s)
	Low Speed (1.5 Mb/s)
Recommended Probing, LS and FS	Single-ended
Recommended Probing, HS	Differential
Formats Available	Mixed Hex
	Hex
	Binary
	Mixed ASCII

Table 53: 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

Table 54: Bus trigger options

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

Characteristic	Description
	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)

Table 55: 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 (HS only)
	Special Packet: PRE (FS only), ERR, SPLIT, PING, Reserved
	Error: PID check, CRC5 or CRC16, Bit stuffing (LS and FS only)

Table 56: 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)



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.

Ethernet characteristics¹

Table 57: 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

Table 58: 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

Table 59: 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

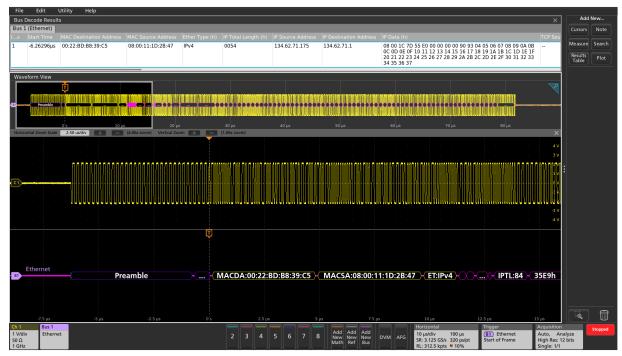
Characteristic	Description
	Idle
	End of Packet
	Frame Check Sequence (CRC) Error

Table 60: Bus search options

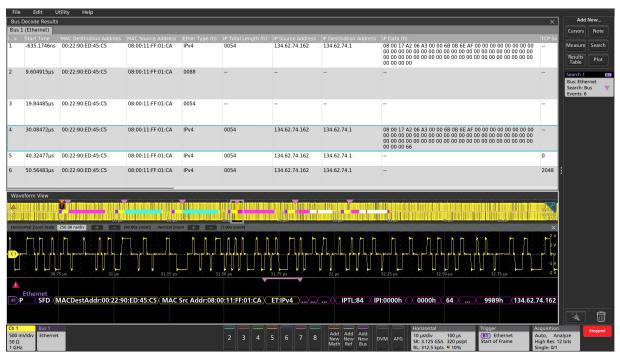
Characteristic	Description
Search On	Start Frame Delimiter
	MAC Addresses
	Q-Tag Control Information
	MAC Length/Type
	IPv4 Header
	TCP Header
	MAC Data
	TCP-IPv4 Client Data
	ldle
	End of Packet
	Frame Check Sequence (CRC) Error

Table 61: Bus decode

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



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

SPMI characteristics¹ (Version 2.0)

Table 62: Bus setup options

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

Table 63: 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

Table 64: Bus trigger options

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

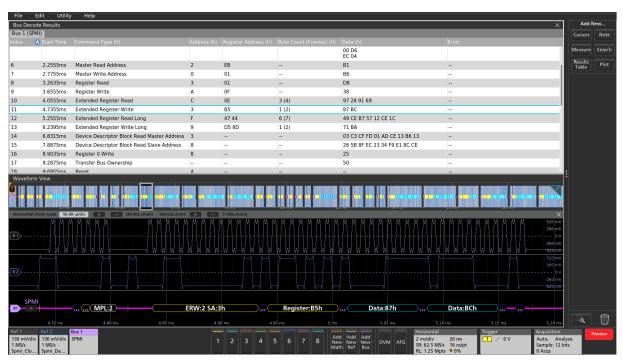
Characteristic	Description
	Extended Register Write
	Extended Register Read Long
	Extended Register Write Long
	Device Descriptor Block Master Read
	Device Descriptor Block Slave Read
	Register 0 Write
	Transfer Bus Ownership
	Parity Error

Table 65: 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

Table 66: 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

Table 67: 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

Table 68: 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

Table 69: Bus search options

Characteristic	Description
Search On	Synchronization
	Control Code
	Control Character
	Data
	Errors

Table 70: Bus decode

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

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	- Q								Display		Cursors Note
			_						On	Stop Acquisition if Event Found	Measure Search
A											
									Search type	Source	Table Plot
*									Bus 🔻	Bus 1 (SpaceWire) 🔻	Search 1
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Honzo	rtal 20011 Se	care 2.00 us/ulv	T	(Secon 20011) Verdeal 20011	(2.40X 20011)				Control Code 🛛 🔻		Search: Bus V Events: 1
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500 mV	/div 500 i	mV/div SpaceWir	e				Add Add	Add	100 µs/div 1 ms	 ✓ 0 V Auto, 	Analyze
104.536	i1 104.	5361				4 5 6 ,	' 8 New New Math Ref	New DVM AFG Bus		Sample: 12	2 bits 18 lun 2019
Ref 1 500 mV 104.536 spacew	i1 104.	mV/div SpaceWir	e		1 2 3	4 5 6 7		New DVM AFG	Horizontal 100 µs/div 1 ms SR: 1.25 GS/s 800 ps/pt RL: 1.25 Mpts 9 5.9%	Trigger Acquisitio	n Analyze Au

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

File	Edit Appli	cations Utility	Help			Tektr	onix				
Bus Decode Results X											
Bus 1 (S	aceWire)					Cursors	Note				
Index					Error						
7	177.9241µs	FCT FCT FCT FCT FCT FCT FCT FCT			-	Measure	Search				
		FCT FCT FCT FCT				Results					
		FCT FCT				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	m.		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			-						
Wavefor	m View										
	ă 👘										
*											
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Horizont	al Zoom Scale 2.	00 us/div 🕂 —	(50.00x zoom)	Vertical Zoom							
					625 m/ 208333 m/						
R 1											
					1.041667 V						
					625 mV						
					206.333 mV						
R 2					2008.33 mV						
186 µs		188 µs	190 µs	192 µs	194 µs 195 µs 198 µs 200 µs 202 µs 204 µs -1.041667 V						
S	aceWire										
B1	FCT:4h	0h FCT	[:4h 🛛 0h	FCT:4h	0h FCT:4h 0h FCT:4h 0h FCT:4h 0h FCT:4h 0h FCT:4h						
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Ref 1		Bus 1		(Horizontal Trigger Acquisition		Auto				
500 mV/c 104.5361		SpaceWire			2 3 4 5 6 7 8 New New New DVM AFG SP: 1.25 GS/c 800 rs/ht Sample: 12 bits	iałyze	Jun 2019				
spacewin					Start 1.25 Wpts Wath Ref Bus Bus		2019 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)

Table 71: 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

Table 72: Display modes

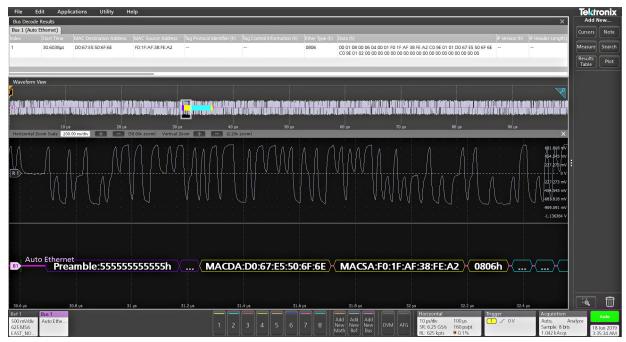
Characteristic	Description
Bus	Bus Only
Results Table	Decoded packet data in a tabular view

Table 73: Bus search options

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

Table 74: Bus decode

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



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)

Table 75: Bus setup options

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

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

Table 76: 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

Table 77: Bus search options

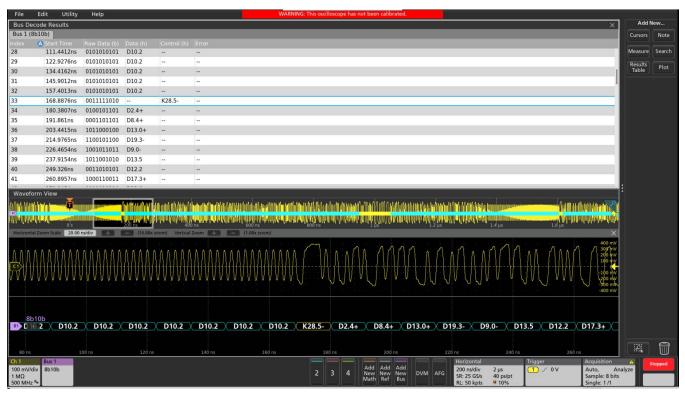
Characteristic	Description				
Search On	Symbols [Format:8bit,10bit&symbol]				
	Errors				

Table 78: Bus decode

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

File	Edit Utility	Help				WARNI	ING: This oscillos	cope has no	ot been calibrat	ed.	SEARCH 1				?		
Bus De	ecode Results															Add	New
Bus 1 (8b10b)										Display					Cursors	Note
Index	Start Time	Raw Data (b)		Control (h)	Error						On			Ac	t on Event 🖪		
28	111.4412ns	0101010101														Measure	Search
29	122.9276ns	0101010101									Search Type		Source			Results	Plot
30	134.4162ns	0101010101	D10.2								Bus	*	Bus 1 (8b10	0b) v		Table	
31	145.9012ns	0101010101	D10.2													Search 1	GH
32	157.4013ns	0101010101	D10.2								Mark On		Format	_		Bus: 8b1	
33	168.8876ns	0011111010		K28.5-							Symbols	×.	8-Bit 1	10-Bit Symb	ol	Search: B Events: 2	
34	180.3807ns	0100101101	D2.4+								Value					Elentorit	
35	191.861ns	0001101101	D8.4+								fine a						
36	203.4415ns	1011000100	D13.0+								K28.5-						
37	214.9765ns	1100101100	D19.3-														
38	226.4654ns	1001011011	D9.0-														
39	237.9154ns	1011001010	D13.5														
40	249.326ns	0011010101	D12.2														
41	260.8957ns	1000110011	D17.3+														
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																10	
80 ns		100 ns	120 ns		140 ns	160 ns	180 ns	s	200 ns		220 ns	240		260 r	ns		
Ch 1	Bus 1								Add Add A		Horizontal		Trigger		Acquisition		Stopped
100 mV/ 1 MΩ	div 8b10b						2 3	4	New New N	ew DVM A	FG 200 ns/div SR: 25 GS/s	2 µs 40 ps/pt		OV	Auto, An Sample: 8 bits	alyze	
500 MH	z B _w								Math Ref B		RL: 50 kpts	¥ 10%			Single: 1 /1		

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

NRZ Characteristics (Line encoding)

Table 79: 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					

Table 80: Display modes

Characteristic	Description
Bus	Bus Only
Bus and Waveforms	Simultaneous display of bus and digital waveforms.
Table continued	•

Table continued...

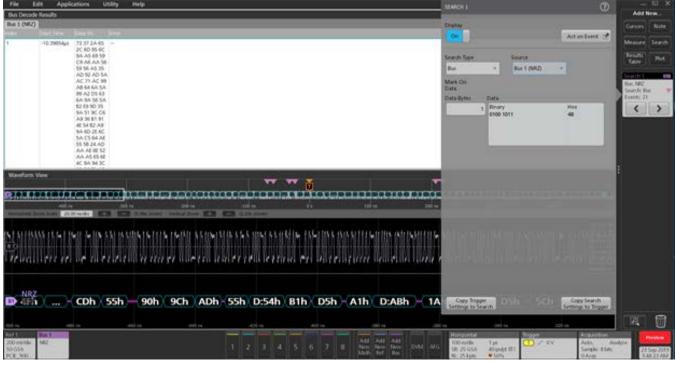
Characteristic	Description
Results Table	Decoded packet data in a tabular view

Table 81: Bus search options

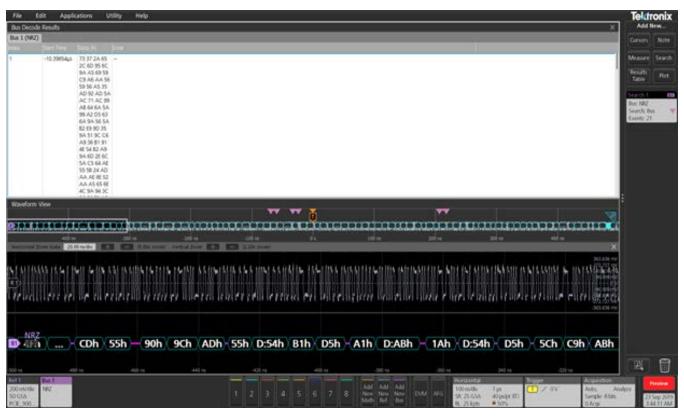
Characteristic	Description	
Search On	Data Bytes [Maximum 5]	

Table 82: Bus decode

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



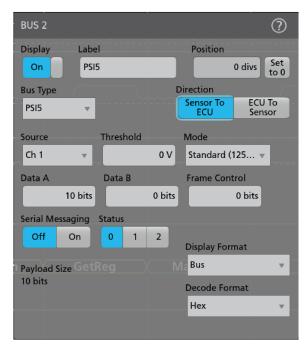
Searching on a specific data symbol in symbol format in the NRZ bus



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

PSI5 characteristics (Version 2.1)

PSI5 Sensor to ECU configuration



PSI5 ECU to Sensor configuration

BUS 2			?
Display Label		Position	0 divs Set to 0
Bus Type PSI5		Direction Sensor To ECU	ECU To Sensor
Source Thresho	old 0 V	Sync Bit Peri	od 60 µs
Sync Mode Data Fo Pulse Tooth Width Gap Nibble			
		Display Forn	nat
n X GetReg		Bus Decode Forr Hex	▼ /load:01h mat

Table 83: Bus setup options

Characteris tic	Description	
PSI5 Sources	Analog channels 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 - Sensor to ECU	Mode	Slow (83.3 kbps) 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 Format	Hex Binary Mixed Hex	

Table 84: 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	

Table 85: Bus search options

Characteristic	Description	
Mark On	Direction - Sensor to ECU	Start [Start of packet] 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

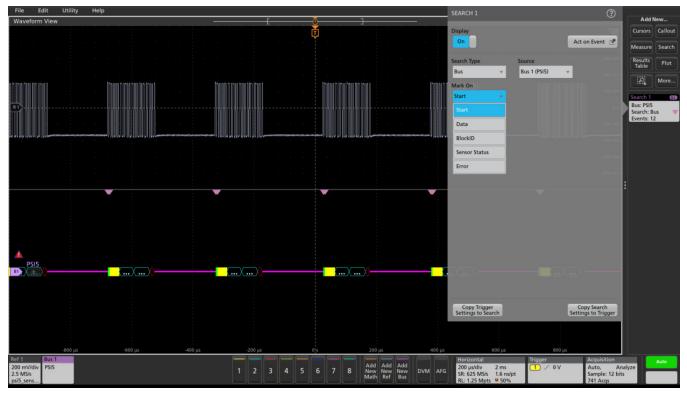


Note: Bus Search option is depend on the direction in Bus Configuration.

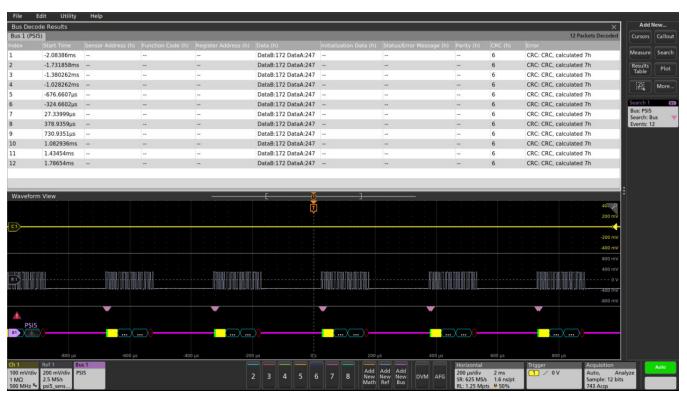
Table 86: Bus decode

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

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

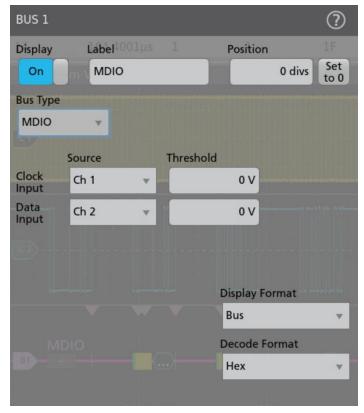


PSI5 Results table

MDIO Characteristics

Table 87: Bus setup options

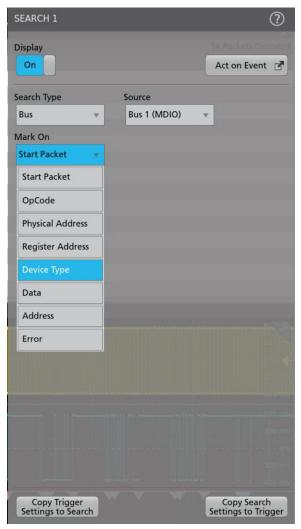
Characteristic	Description
MDIO Sources (Clock, Data)	Analog channels
	Digital channels
	Active Math channels
	Active Reference channels
Thresholds	Pre-channel thresholds
Recommended Probing	Single-ended
Formats Available	Hex
	Binary
	Mixed Hex



Bus configuration

Table 88: Bus search options

Characteristic	Description
Search On	Start Packet
	OpCode
	Physical Address
	Register Address
	Data
	Error: Any, OpCode Error, Device Type Error



Search configuration

Table 89: 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

Table 90: 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)
	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)

Table 91: Bus setup options

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

BUS 1					?
Display	1µ Label			Position	
On	SVID			-2.06 divs	Set to 0
Bus Type	•				
SVID					
ann Staile	Source		Threshold		
Clock Input	Ref 1		50	0 mV	
Data Input	Ref 2	Ŧ	50	0 mV	
Alert Input	Ref 3	v		0 V	
			D	isplay Format	
			E	Bus	Ŧ
			D	ecode Format	
∕Start√			h V M	Hex	v
(Second C)	SHIGH A				

Bus configuration

Table 92: Bus search options

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

Display	510.Pa	ckets Decode
On	Act	on Event 🛃
earch Type	Sla source ty: Incorrect Parity	
Bus	Bus 1 (SVID)	
	Slave Hancy: incorrect Parity	
Aark On		
Start •		
Start		
c)		
Slave Address		
Command		
Payload		
Fayload	Slave Parity: Incorrect Parity	

Search configuration

Table 93: 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

Table 94: Bus decode

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



e-USB2 (Version 2.0)

Table 95: 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		Position 0 divs Set to 0
Bus Type		Speed	Mode
eUSB	Ψ.	Low (1.5 🔻	Native Repeater
	Source	Threshold	
D+ Input	Ch 1	·	ov
D- Input	Ch 2		ov
B1			
			Display Format
			Bus 🔻
			Decode Format
			Mixed Hex 🔍

Table 96: 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)

Bus configuration

SEARCH 1			?
Display On		Act on Even	t 🗗
Search Type	Source		-100100
Bus v	Bus 1 (eUSB)	Y	-200
Mark On			-
Control Message 👻			8
Sync			400 mV
			300 mV
Handshake Packet			100 mV
Special Packet			📢
Error			-100 mV
Token Packet			-200 mv -300 mV
loken Packet			-400 mV
Data Packet			
Reset	A		-400 mV Mittaniv
Connect			200 mV
			100 mV
Control Message			0.9
Suspend			-200 mil
Device Chirp	$\sim 1 \sim \lambda_{c}$		-300 mV
	104.1 ja		-400 mV
Host Chirp			
Port Reset			
Port Configuration			
Resume/Wake	68h	Copy Sear Settings to Tr	ch igger
End of Packet		Jetungs to II	igger

Search configuration

Table 97: Bus decode

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

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

Table 98: 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

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

Bus Deco	ode Results											×	Add	New
Bus 1 (eUS REPEA	B-HOST- TER) Bus	2 (eUSB- IPHERA									96 Pack	ets Decoded	Cursors	Callout
Index	A Start Time											CR	Measure	Search
1	-99.08332µs	DATA0									18 01 66 58 E6 17 A2 0A 60	D 7F 8A F	Describes	
2	-98.67706µs	DATA0									18 01 66 58 E6 17 A2 0A 60	D7F8AF	Results Table	Plot
3	-98.27081µs	DATA0					-				18 01 66 58 E6 17 A2 0A 60	07F8A F		
4	-97.86456µs	DATA0									18 01 66 58 E6 17 A2 0A 60	D7F8A F		More
5	-97.45831µs	DATA0							-		18 01 66 58 E6 17 A2 0A 60	07F8A F		
6	-97.05206µs	DATA0									18 01 66 58 E6 17 A2 0A 60	D7F8A F		
7	-96.6458µs	DATA0					-				18 01 66 58 E6 17 A2 0A 60	07F8A F		
8	-96.23956µs	DATA0									18 01 66 58 E6 17 A2 0A 60	D7F8A F		
9	-95.8333µs	DATA0									18 01 66 58 E6 17 A2 0A 60	07F8A F		
10	-95.42707µs	DATA0									18 01 66 58 E6 17 A2 0A 6E	07F8A F		
11	-94.84372µs			-			-		-			-		
12	-85.92705µs											-		
13	171.2468µs	DATA0							-		18 01 66 58 E6 17 A2 0A 60	D 7F 8A F		
B II Horizontal 2	Zoom Scale 7.00	III III 224 ps us/div + - (32.00x zoom) V	44ULps	672 <u>15</u>		ибра ни	1.120 rHJ	+ II 1,344 ms	III III.568 ms	II 1.79 Illus			
<u> </u>	IUISJ&RASTST B-HOST-REPEA	NER				SYNC PID:DA Data:1	TA0 8h		 					
	686 µs			700 µs	707 µs		-) 14 μs	-OIII _{1 µs}	γ _{28 μs}	735 µs	742 µs			
B2 +	B-PERPIPHERA				me/Wake									
1 MΩ	v 200 mV/div 1 MΩ 500 MHz ^B *	1 MΩ	iv 200 mV/div 1 MΩ 500 MHz ^B w	Bus 2 eUSB				Add New Math Re		Horizontal 224 µs/div 2.24 m SR: 3.125 GS/s 320 ps RL: 7 Mpts 9 10%	/pt 1 / 0 V	Acquisition Manual, An Sample: 12 bit: 0 Acqs	alyze 02	Preview Apr 2020 28:08 AM

Results table with decoded waveform

Manchester Characteristics (Line encoding)

Table 99: 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 On Manchester O divs Set to 0 Bus Type Transition For '0 Data Rate Manchester Threshold Start Index Ref 1 V OV 1 edge Tolerance 10% Display Format Bus View Decode Format Hex V
Recommended Probing	Differential/Single ended
Formats Available	Hex Binary
Packet View	BUS 1 Image: Constraint of the second se

Table 100: 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)

Table 101: 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

Table 102: Bus decode

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

Table 103: 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	

lable continued...

Character istic	Description	
Search On	Data	Mark On
(Packet View OFF)	Errors	Data

Table 104: 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

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

Table 105: Bus setup options

	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 Odivs Set Odivs
Recommended	Clock – Single Ended/Differential
Probing	Data – Single Ended
	Single ended probe: No. of probes: 3 (D+ and D- by default)
	Differential probe: No. of probes: Not supported
8b9b encoding mode	Select line encoding in LPDT and HS mode.
Formats Available	Hex
	Binary

Table 106: 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

Table 107: Bus decode

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

Table 108: 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

Index parket(2); Unframed Lineacoverable ECC Search Type Bus S Bus 1 (DPHY) T Mark On SoT EoT Data SoT EoT Data Scrambling Compression Packets BusTurnAround Escape Stop	SEARCH 1							?	
Sorrambling Compression Packets Bus TurnAround Escape Errors	Display								
Bus Bus 1 (DPHY) Mark On SoT SoT Compression Packets BusTurnAround Escape Stop Frrors	On					Act	t on E	vent 🛃	
Bus Bus 1 (DPHY) Mark On SoT SoT Compression Packets BusTurnAround Escape Stop Frrors	mplete packet(2); l		Unrecove						
SoT v SoT v SoT v EoT v Data ed. Unrecoverable ECC Scrambling v Compression v Packets v BusTurnAround v Escape v Stop v Errors v				DPHY)	-	,	-		
SoT EoT Data Scrambling Compression Packets BusTurnAround Escape Stop	Mark On								
EoT Data Scrambling Compression Packets BusTurnAround Escape Stop Frrors	SoT	•							
Data ed: Unrecoverable ECC Scrambling Compression Packets BusTurnAround 2000 Escape Stop									
Data Scrambling Compression Packets BusTurnAround Escape Stop Frrors	EoT								
Compression Packets BusTurnAround Escape Stop Errors	Data	ned:							
Compression Packets BusTurnAround Escape Stop Errors	Scrambling	_							
Packets Packets BusTurnAround Escape Stop Errors									
BusTurnAround 200 Escape 200 Stop 200 Errors 200		_							
Escape									1
Stop 400									
Frrors	-								
Errors	Stop								
800 r 400 r	Errors								2
									1
									1
									7
									7

Bus search options

Table 109: 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	Sinulaneously
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)

Table 110: 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



Table 111: Display modes

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

Table 112: Bus decode

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

Table 113: 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

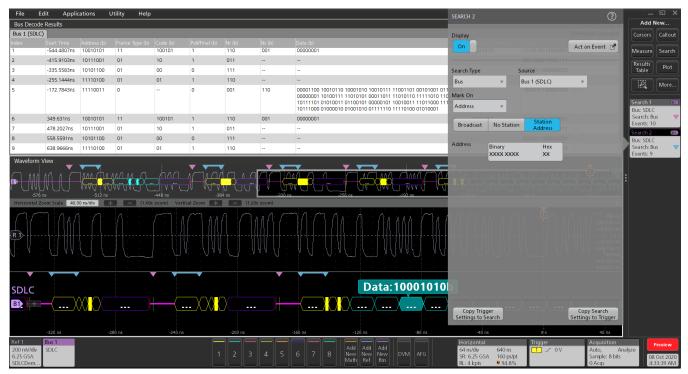


Bus search options

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



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)

Table 114: 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
Bit Rate	Specifies the data rate in High Speed Mode

Table 115: 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

Table 116: 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

Table 117: 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

не Virtual Identifier (b) 44405	LP-01 LP-00 LPDT Command LP-11 LP-01 LP-00 	Data Type (b) 001000 	ECC (b) 00000001	X 142 Packets Decoded Data (b) 	Waveform View	Add Cursors
944µs 11µs 23µs 00 17µs 49µs 10 10 95ns	LP-01 LP-00 LPDT Command LP-11 LP-01 LP-00 	 001000		Data (b) 		Cursors
944µs 11µs 23µs 00 17µs 49µs 10 10 95ns	LP-01 LP-00 LPDT Command LP-11 LP-01 LP-00 	 001000				
11μs 23μs 00 17μs 49μs 10 10 95ns	LP-00 LPDT Command LP-11 LP-01 LP-00	001000				
23µs 00 17µs 49µs 10 10 95ns	LPDT Command LP-11 LP-01 LP-00		00000001			Measure
17µs 49µs 10 10 95ns				00001111 00001111	88133-HS	Results Table
95ns					B8TB3-LP	
	1 P-11 P-01 P-00	101101 101101		Pixel A:10101000 Pixel B	-123.072 μs -92.304 μs -61.536 μs -30.768 μs 0 s 30.768 μs 61.536 μs 92.304 μs 123.072 μs	0
4ns 01 01	LI TI LI FUT LEFOU				Horizontal Zoom Scale 100.00 ns/div + (307.68x zoom) Vertical Zoom + (1.00x zoom) X	
		100100 100100		Blue0:10100010 Green0: Green1:01100001 Red1:	····· δ00 mV	
2µs	LP-11 LP-01 LP-00				400 mV	
4µs 10 10		100000 100000		Blue0:1110 Green0:0001		
Зµs	LP-11				-200 mV	
6µs	LP-10				· · · · · · · · · · · · · · · · · · ·	
8µs	LP-00					
μs	LP-01				· · · · · · · · · · · · · · · · · · ·	
1µs	LP-00					
3µs 00	LPDT Command	001000	0000001	00001111 00001111		
Зµs	LP-11 LP-01 LP-00				🚔 a la a a a la a la a la a la a la a l	
μs 10 10		101101 101101		Pixel A:10101000 Pixel B	• • • • • • • • • • • • • • • • • • •	
2µs	LP-11 LP-01 LP-00				····	
7µs 01 01		100100 100100		Blue0:10100010 Green0:		
	LP-11 LP-01 LP-00			-	600 mV	
9µs 10.10		100000 100000		Blue0:1110 Green0:0001		
	LP-11				C	
7µs	LP-10					
9µs	LP-00			-		
	LP-01					
				-	Data Type:100100b	
	LPDT Command	001000	00000001	00001111 00001111		
	LP-11 LP-01 LP-00			-		
				Pixel A:10101000 Pixel B		
					B8133-LP	
2µs 01 01		100100 100100		Blue0:10100010 Green0:	-200 ns -100 ns 01s 100 ns 200 ns 300 ns 400 ns 500 ns 600 ns 700 ns	
	ising	Pick Pick Pick Pick Sigs Pick LP-00 Sigs Pick LP-00 Sigs Pick LP-00 Sigs O LP-01 Sigs Pick LP-11 Sigs Pick LP-00 Sigs Pick LP-01 Sigs Pick LP-01 Sigs Pick LP-11 Sigs Pick LP-11 Sigs Pick LP-01 Sigs Pick LP-11 Sigs Pick LP-11 Sigs Pick<	Figs LP-10 Bys LP-00 Bys LP-00 Bys 0 LP-00 Bys 0 LP-01 Bys 0 LP-11 LP-01 LP-00 Bys 0 LP-11 LP-01 LP-00 Bys 10.10 101101101101 Bys 0.10 10010010000 Bys 0.10 1000001000000 Bys 10.1 100000100000 Bys 10.1 100000100000 Bys 10.1 100000100000 Bys 10.1 Bys 10.1 Bys LP-11 Bys LP-10 Bys LP-00 Bys 10.10 101101101101	App P-10 Bys P-00 Bys P-00 Bys P-00 Bys P-00 Bys 0 P-00 Bys 0 P-01 P-00 Bys 0 P-01 P-01 Bys 1010 - 1011010110 Bys 1010 - 10010000 Bys 1010 - 100101000 Bys 1010 - 1001001000 Bys 1010 - P-111P-011P-00 - <t< td=""><td>Rigs </td><td>Figs LP-10 Bys - LP-00 - Bys - LP-01 Bys - LP-01 Bys - LP-00 Bys 0 LP-11 Bys 0 LP-11 O-10 Bys 0 LP-11 -</td></t<>	Rigs	Figs LP-10 Bys - LP-00 - Bys - LP-01 Bys - LP-01 Bys - LP-00 Bys 0 LP-11 Bys 0 LP-11 O-10 Bys 0 LP-11 -

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

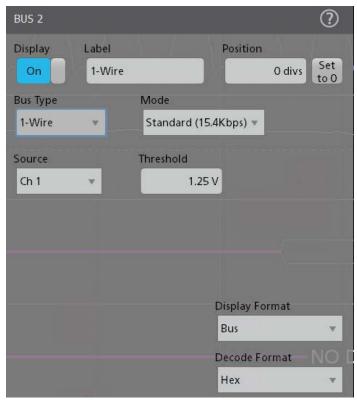


CPHY search results display

ONEWIRE Characteristics

Table 118: 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

Table 119: Display modes

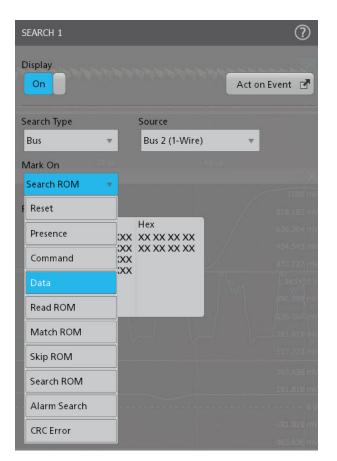
Characteristic	Description
Bus	Bus Only
Result Table	Decoded packet data in a tabular view with columns containing:
	Initialization
	ROM Command
	ROM Code
	CRC
	Command
	Data
	Error

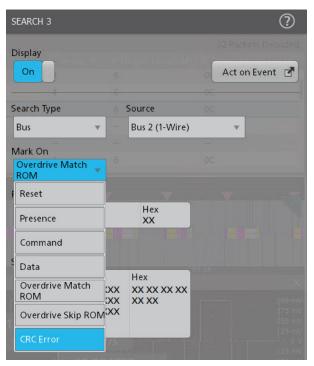
Table 120: Bus decode

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

Table 121: Bus search options

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





Search on 1-WIRE

File E	dit Applic	ations Utility	Help Debug								—	ω×
Bus Decod	Results									×	Add N	lew
Bus 1 (1-Wi	e)									46 Packets Decoded	Cursors	Callout
Index	Start Time	Initialization	ROM Command (h)	ROM Code (h)		CRC (h)	Command (h)	Data (h)	Error			
1	-1.291216ms	Reset:-1.291216ms									Measure	Search
2	-775.2975µs	Presence:-775.2975µs	Search ROM	ROM Code:3400000544	473910				-		Results	Plot
3	15.0041ms	Reset:15.0041ms									Table	
4	15.52066ms	Presence:15.52066ms	Match ROM	Family Code:10 Serial Nu	mber:00000054A739	2C	44					More
5	1.022878s	Reset:1.022878s										
6	1.023387s	Presence:1.023387s	Match ROM	Family Code:10 Serial Nu	mber:00000054A739	2C	BE	2D 00 E8 80 FF FF 18 54 8E			Search 1	80
7	1.060963s	Reset:1.060963s									Bus: 1-Win Search: Bu	
8	1.061473s	Presence:1.061473s	Search ROM	ROM Code:CE0000045CF	FFBD28				-		Events: 15	
9	1.108843s	Reset:1.108843s										
10	1.109358s	Presence:1.109358s	Match ROM	Family Code:28 Serial Nu	mber:0000045CFFBD	73	44		-			
11	2.11666s	Reset:2.11666s				-		-				
12	2.11717s	Presence:2.11717s	Match ROM	Family Code:28 Serial Nu	mber:0000045CFFBD	73	BE	78 01 4B 46 7F FF 08 10 51	-			
13	2.4268125	Reset:2.426812s										
14	2.427328s	Presence:2.427328s	Search ROM	ROM Code:340000054.4	\$73910							
Waveform	view										:	
						, 📩				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
BD							A Code:340000005					
	-40 ms	-30 n		-20 ms				10 ms 20 ms	30 ms	40 ms		
Horizontal Z	oom Scale 400.0		(25.00x zoom) Vert		(1.60x zoom)	410				×		
			an a	and the second second				a sa		· · · · · 6.25 V		
	· · · ·	· · · · · · · · · · · · · · · · · · ·			ון ו ויידאו	יות ורד	<u> </u>	יין (ביורייון אין) א				
										5,V 3.75 2.50 1.25 V		
R 1			. المسا المسا ا	- hand hand hand hand hand hand	L	ـ المسالسيا ـ	السبا ــ لا ــ لا ــ	mall_l_l_l_l_hundle	_ المسال السما إسما السما	_ Honeral H freeward here and here and here and free of by		
										-1.25 V -2.50 V		
	v											
1-W	ire								00000544700			
B1 +		N	latch ROM	Family C	.ode:10h			Serial Numb	er:00000054A739	n		
	15.6 ms	16 ms	16.4 ms	16.8 ms		2 ms	17.6 ms	18 ms	18.4 ms	18.8 ms 19.2 ms		
Ref 1	Bus 1								Horizontal	Trigger Acquisition		Preview
2 V/div	1-Wire						7 8 Ne		o 10 ms/div 100 ms	1 ∕ 0V Auto, A	nalyze 🛛 💆	
1 MS/s 1-wire_10								ith Ref Bus	SR: 12.5 MS/s 80 ns/pt RL: 1.25 Mpts 9 50%	Sample: 12 bit 0 Acgs		Feb 2021 53:58 AM

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

File E	dit Applic	ations Utility	Help Debug							SEARCH 1		?	— 1	Β×
Bus Decode	Results												Add M	lew
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:340000054A	73910					Search Type	Source		Results Table	Plot
3	15.0041ms	Reset:15.0041ms								Bus 👻	Bus 1 (1-Wire)	· ·		\equiv
4	15.52066ms	Presence:15.52066ms		Family Code:10 Serial Nur	mber:00000054A739		44		_					More
5	1.022878s	Reset:1.022878s								Mark On				
6	1.023387s	Presence:1.023387s	Match ROM	Family Code:10 Serial Nur	mber:00000054A/39	2C	BE	2D 00 E8 80 FF FF 18	54 8E	Match ROM v			Search 1 Bus: 1-Wir	BD
7	1.060963s	Reset:1.060963s								Family Code			Search: Bu	is 🔍 🔻
8	1.061473s	Presence:1.061473s	Search ROM	ROM Code:CE0000045CF	FBD28					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 Nur	mber:0000045CFFBD	73	44							
11	2.11666s	Reset:2.11666s								Serial Number				
12	2.117175	Presence:2.11717s	Match ROM	Family Code:28 Serial Nur	mber:0000045CFFBD	73	BE	78 01 4B 46 7F FF 08	10 51	Binary	Hex			
13	2.4268125	Reset:2.426812s			72040				_	XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXX				
14	2.427328s	Presence:2.427328s	Search ROM	ROM Code:3400000054A	(73910				_	XXXX XXXX XXXX XXXX				
B) Horizontal Zo	-40 ms om Scale 400.0	-30 n 00 us/div + -	s (25.00x zoom) Ver		-10 ms (1.60x zoom)		M Code:34000000	4473910h	20 ms	30 ms	40			
R1												3.75 V 2.56 V 1.25 V 1.25 V 1.25 V 2.50 V 3.75 V		
1-W	ire	(latch ROM	Family C	ode:10h 📈			Serial N	umbe	Copy Trigger Settings to Search	9n	Copy Search Settings to Trigger		
	15.6 ms	16 ms	16.4 ms	16.8 ms	17	'.2 ms	17.6 ms	18	ms	18.4 ms	18.8 ms	19.2 ms		
Ref 1 2 V/div 1 MS/s 1-wire_10	Bus 1 1-Wire			1	2 3 4	5 6		dd Add Add ew Ref Bus D\		Horizontal 10 ms/div 100 ms SR: 12.5 MS/s 80 ns/pt RL: 1.25 Mpts 950%	Trigger	Acquisition Auto, An Sample: 12 bits 0 Acqs	alyze 10	Preview Feb 2021 55:28 AM

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

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

Table 122: 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.

Table 123: Display modes

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

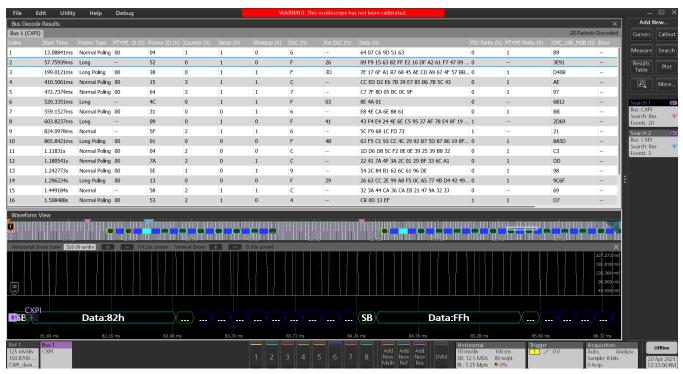
Description				
• Sleep				
Wakeup				
Counter				
• DLC				
EXTDLC				
• Data				
Frame Parity				
Ptype parity				
• CRC				
Errors				

Table 124: Bus decode

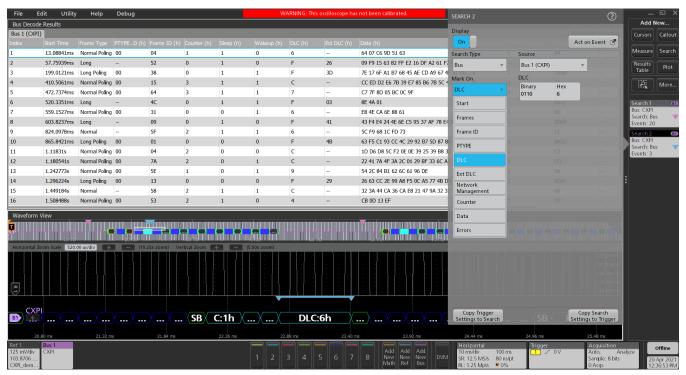
Characteristic	Description
Maximum Clock/Data Rate	20 kbs
Decode Display	 IFS (start event-vertical), Start bit and stop bit (Green) Frame ID (Yellow) IBS: (Dark blue) Data, Counter, wakeup, sleep, DLC, and EXTDLC (cyan) Parity and CRC (Purple)
Error Handling	 CRC Parity IBS Frame error

Table 125: Bus search options

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



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)

Table 126: 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 $$	
	 Active Probes P7240 TPP1500 Low Voltage Single Ended Probes 	
Differentiators	 Protocol Search options (additional search options available under protocol decode): 	
	 a. Start and End Events b. Wait States c. Data d. Errors – Invalid command type, Invalid cycle type, Fatal/Non-Fatal Errors. 2. Decode formats in MIXED HEX. 	

Table 127: Bus setup

Characteristic	Description
Single Mode (Default)	BUS 1
	Display Label Position
	Bus Type I/O Mode Alert eSPI v Single Dual Off
	Source Threshold Polarity
	SCLK Ch 1 🔻 OV 🖊 🔪
	CS Input Ch 2 🔻 0 V Active High Low
	Command Input Ch 3
	Response Input Ch 4 - OV Active Low
	Display Format Bus 👻
	Decode Format Mixed Hex 🔻
Dual Mode	BUS 1
	Display Label Position
	Bus Type I/O Mode Alert
	eSPI V Single Dual Off
	Source Threshold Polarity
	SCLK Ch 1 V 🖊 🔪
	CS Input Ch 2 v 0V Active Low
	IO[0] Input Ch 3 The second se
	IO[1] Ch 4 v OV Active Active High Low
	Display Format Bus
	Decode Format Mixed Hex 💌
	19Å-11 00 -1

Table 128: Display modes

Characteristic	Desc	cription
Bus	Bus	only
Result Table		oded packet data in a tabular view with nns containing:
	1.	Command OpCode
	2.	Cycle Type
	3.	Header
	4.	Address
	5.	Data
	6.	Response
	7.	Status
	8.	CRC
	9.	Error
	10.	PEC

Table 129: 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

Table 130: 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 V Mark On Start Channel Independent Peripheral Channel Virtual Wire Channel Flash Access Channel		



Characteristic	Description
Mark On and Channel Independent	SEARCH 2 ⑦
	On Act on Event
	Bus v Bus 1 (eSPI) v
	Mark On 200 m. OOB Channel T 200 m.
	Phase Command Response
	Binary Hex XXXX X
	Length XXXX XXXX XXXX XXXX XXX
	SMBus Slave Binary Hex Address XXXX XXXX XX
	SEARCH 2
	Display On Act on Event
	Search Type Source
	Mark On Virtual Wire Channel
	Phase Command Response With Response Header Without Header
	Command Opcode
	Virtual Wire Binary Hex Count XXXX XXXX XX And the second
	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 Bus With On Virtual Wire Channel Phase Command Response With Header Peripheral, OOB, and Virtual Wire Channel
Mark On and Channel Independent	SEARCH 2 Display On Act on Event Search Type Bus V Bus 1 (eSPI) Mark On Flash Access Channel V Bus 1 (eSPI) Phase Command Response With Response Action Flash Access ful Completion Tag Binary Successful Completion Tag Binary Successful Completion With Data Binary Unsuccessful Completion With Data Binary Unsuccessful Completion Successful Completion With Data Binary Without Data Binary Without Data Binary Without Data

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

	Edit Utility	Help Debug		WARNING: This oscilloscope has not been calibrated.			
Bus Deco	de Results						X Add Nev
Bus 6650	eSPI)					161 Packe	ets Decoded Cursors C
							Res
4	-94.17032µs	-	Message	Tag:6 Length:00E MessageCode:FB Message Specific LSB_MSB:44A689EE	-	-	Pł Measure S
5	-91.88539µs	GET_PC					Results
6	-91.51529µs	-	Message With Data	Tag:1 Length:00A MessageCode:0A Message Specific LSB_MSB:2D1E773A	-	68 15 E5 8B 4E 0A 71 78 D1 54	Pł Table
7	-88.13188µs	GET_PC	-	-	-	-	
3	-87.76182µs	-	Memory Write 64	Tag:0 Length:018	66827775129E81AD	42 CB 48 6D EE 76 FC 63 F9 E3	D4 49 Pł
)	-82.6694µs	GET_PC	-	-	-	-	- Search 1
)	-82.29928µs	-	Memory Write 64	Tag:A Length:018	B6C50E1B2AEE6D17	21 2B 1C C4 08 35 B7 D1 D6 A5	A2 E6 Pł Bus: eSPI Search: Bus
	-76.71867µs	PUT_NP	Memory Read 32	Tag:1 Length:00D	64F7B7D4	-	- Events: 81
2	-75.49406µs	-	Successful Completion With Data	Tag:6 Length:00D	-	82 EE E9 96 C7 F2 CF EB 58 B5 I	
	-72.72088µs	PUT_NP	Memory Read 64	Tag:D Length:007	D32CF00634899EE1	-	
	-71.00818µs		Successful Completion With Data	Tag:4 Length:007		5D 5D A9 52 E5 A3 5C	Pł
5	-68.23504µs	GET_NP	-	-		-	
5	-67.86505µs	-	Memory Read 32	Tag:C Length:009	5CAD3DD6		Pł
	-65.94633µs	GET_NP					- 1
550-CMD 550-RSP				n ; =====		f f anna 1 f a f f f - f - f - f	III II S
650-CMD						f f anna 1 f a f f f - f - f - f	III II S
650-CMD				n ; =====		f f anna 1 f a f f f - f - f - f	
50-CMD				n ; =====		f f anna 1 f a f f f - f - f - f	
50-CMD				n ; =====		f f anna 1 f a f f f - f - f - f	
50-CMD				n ; =====		f f anna 1 f a f f f - f - f - f	
50-CMD	Zoom Scale 100.			n ; =====		f f anna 1 f a f f f - f - f - f	
50 CMD 50 RSP orizonta	200m Scale 100	00 ra/div + - C20	00x 200m) Vertical Zoom + -			f f anna 1 f a f f f - f - f - f	
50 CMD 50 RSP orizonta	200m Scale 100	00 ra/div + - C20		1 1			
so cMD so rsp orizonta 4	200m Scale 100.	00 ra/div + - C20	00x 200m) Vertical Zoom + -	1 1			
350 CMD 350 RSP orizonta 4 6650-CM	200m Scale 100.	00 ra/div + - C20	00x 200m) Vertical Zoom + -				
4 5650-CMD	200m Scale 100.	00 ra/div + - C20	00x 200m) Vertical Zoom +	1 1			
4 5650-CMD	200m Scale 100.	00 ra/div + - C20	00x 200m) Vertical Zoom +	1 1			
550-CMD 550-RSP	200m Scale 100.	00 ra/div + - C20	00x 200m) Vertical Zoom +	1 1			1.052632 V -3.252632 V -1.052632 V -1.052632 V -1.052632 V
550-550 550-550 5650-CM	2000 Scale 100	00775/1UU + - C200	202 zoom) Vertical Zoom	1 1		(* ******** (******* (****************	1.052632 V -3.252632 V -1.052632 V -1.052632 V -1.052632 V
550 CMO 550 TSP 5550 - CM 5550 - CM	227 µs 42.7 µs ch 2	00 mardity + - c20.	00. zoom) Vertical Zoom	7h 	DFh Wait State:	11 mmmm Person (1) Peri (11 mmmm 1) 1 mm 1 11 mmmm	1.052632 V 2.26332 V 1.152632 V 2.26332 V 0.152632 V 2.2631579 V 2.1637695 V 2.1637695 V 2.1637695 V
0 CMD 10 RSP 11 ZONTA 5550 - CM	200m Scale 100 eSPI 827 µs 627 µs 627 µs	00775/1UU + - C200	00. zoom) Vertical Zoom	Image:	DFh Wait State:		1.052632 V 1.052632 V 1.052632 V 1.052632 V 1.1576947 V 0Fh 2.631579 V 3.157995 V 3.157995 V

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

Bus Decode	Results													×	Add Inch.
Bus 1 (eSPI)														113 Packets Decoded	Cursors Call
ndex	Start Time	Command OpCode (h)	Cyclepe (h)	Header (h)	Address (h)	Data (h)	Response (h)	Status (h)	CRC (h)	Error					
	-527.0141µs	PUT_MEMWR32_SHORT 1BYTE			6F9379A7	7D			37	-					Measure Sea
	-523.3821µs	-	-	-	-	-	Phase:48 M	338C	04						Results Pla
	-520.4141µs	GET_PC							07						Table
	-518.7821µs	-	Memory Wri	Tag:3 Lengt	B6F55739	C6 ED 1F E2.	Phase:48 M	2345	1A						Mor
	-489.0141µs	PUT_VWIRE	-	VWC:1E	-	VWI:5E VW	-	-	C9						
	-462.9821µs	-					Phase:88 M	3124	37						Search 1
	-460.0141µs	GET_STATUS	-	-	-	-	-	-	FB						Bus: eSPI
	-458.3821µs	-					Phase:08 M	3185	C8						Search: Bus Events: 1.302k
	-455.4141µs	PUT_MEMRD32_SHORT			BF0BCA59				F2						
)	-452.1821µs	-				3B 33	Phase:48 M	33AC	D3						
	-448.4141µs	GET_FLASH_NP			-		-		3F	-					
2	-446.7821µs		Flash Write	Tag:0 Lengt	ACEAFB63	D7 7A 72 A	Phase:C8 M	1305	7E	-					
3	-410 6141us	PUT MEMWR32 SHORT 18YTE		-	6F9379A7	7D			37						
Vaveform \															
E	-16 µs		4	3 µs	-4 µs								16 µs		
-	om Scale 640.	00 ns/div + - (6.25x ;	zoom) Vertical	Zoom 🔫	(7.00x :	zoom)								×	
D7															
D6															
D5															
D3			יהייהייה		· · · · · · · · · · · · ·	יהי הי הי ו				· m · m · m · m					
D2															
D1(
D0(10.24		10.88 µs	L1.52 μs	12.16	5.05	12.80 µs		13.44 µs		14.08 µs	14.72 µs		5.36-µs	16 µs	
eSPI		/ /	Addro	ss:BF0E			Fab	 /			33h Stat				
			Auure	55.DFUD	CASSI	^	FZII				SSILVE	IUS.SSAC			
	Bus 1 eSPI									Add Add	Horizont 4 µs/div	al 40 µs	Trigger	Acquisition Auto, An	alyze
gitar 25 MS/s	ean											S/s 160 ps/pt		Sample: 8 bits	29 Apr 2
pi_Dual									Math	Ref Bus	RL: 250 kp	its 🌹 50%		0 Acqs	11:47:21

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

) 9-1.132) 9-2.239 88.1318 -87.7618 2 -82.2694) -82.6694) -82.2694 1 -76.7188 2 -75.494 3 -72.7208 4 -71.008 5 -68.253 5 -67.865 7 -65.946 3 -65.576 -6 -69.262 -6 -65.276 -6 -65.276 -6 -65.276 -6 -65.276 -6 -65.276 -6 -65.276 -6 -65.276 -6 -65.276 -6 -65.276 -7 -60.926 -7 -60.927 -7 -61.2122 -6 -61.212 -6 -61.212 -7 -7 -7 -7 -7 -7	ne доуд 5 Корд 5 Кара 5	Cycle Type (h) ressaye with Data Memory Write 64 Memory Read 64 Successful Completion With Data Memory Read 64 Successful Completion With Data Memory Read 64 Successful Completion With Data 	Header (h) Tegis Length Con Pressage UVECUN Pressage Specific Lsb_P130.2012/124 Tagis Length:018 Tagis Length:018 Tagis Length:000 Tagis Length:000 Tagis Length:007 Tagis Length:007 Tagis Length:009 Tagis Length:001 Tagis Length:001 Tagis Length:008 	 668277 	On 21 22 27 28 27 28 27 28 27 28 27 28 27 28 27 28 27 28 28 28 28 28 28 28 28 28 28 28 28 28	Without Header Cycle Type	Cursors Callot Measure Searc Table Plot 2022 More Search 1 20 Bus oSPI Search Rus Events: 2
) 9-1.132) 9-2.239 88.1318 -87.7618 2 -82.2694) -82.6694) -82.2694 1 -76.7188 2 -75.494 3 -72.7208 4 -71.008 5 -68.253 5 -67.865 7 -65.946 3 -65.576 -6 -69.262 -6 -65.276 -6 -65.276 -6 -65.276 -6 -65.276 -6 -65.276 -6 -65.276 -6 -65.276 -6 -65.276 -6 -65.276 -7 -60.926 -7 -60.927 -7 -61.2122 -6 -61.212 -6 -61.212 -7 -7 -7 -7 -7 -7	жлунь	Pressage won baka Memory Write 64 Memory Write 64 Memory Read 32 Successful Completion With Data Memory Read 64 Successful Completion With Data Memory Read 32 Memory Read 64	Гаў.1 Length:004 Messagecule.uk Message Specific L36_M36/2012/12/ — Тар:0 Length:018 — Тар:A Length:018 Тар:1 Length:000 Тар:0 Length:000 Тар:0 Length:007 Тар:4 Length:007 Тар:4 Length:007 — Тар:4 Length:007 Тар:4 Length:007 — Тар:4 Length:007 — — Тар:4 Length:007 — — Тар:4 Length:007 — — — Тар:4 Length:007 — — — — — — — — — — — — —	 - -	Display 42 ci On 21 ci Search Type 21 ci Bus 21 ci Mark On 21 ci Peripheral Channel 21 ci Phase 10 ci Command Header Command Opcode 10 ci	As op EE 76 Act on Event C Source III 35 87 01 DB AS A2 66 Bus 6650 (eSP) C 2 0 EB SIRS DS 25 E2 AS 52 E5 A3 5C h Response Without Header Cycle Type	Results Plot Table More Search 1 Bus: eSPI Search: Bus
7 -88.1316 8 -87.7619 8 -87.619 9 -82.669 9 -82.669 9 -82.699 1 -76.718 2 -75.494 3 -72.706 4 -71.0081 5 -67.3595 7 -65.9463 3 -62.9520 0 -62.9250 0 -62.2220 0 -61.2122 0 -61.2122 0 -61.2123 0 -62.9251 0 -61.2122 0 -61.2123 0 -61.2123 0 -62.9251 0 -63.2123 0 -63.2123 0 -63.2123 0 -63.2123 0 -63.2123 0 -63.2123 0 -63.2123 0 -63.2123 0 -63.214	88µs GET_PC 88µs - 49µs GET_PC 67µs PUT_NP 96µs - 96µs PUT_NP 96µs GET_NP 96µs			 668277 B6C500 64F7B7 D32CF0 - - SCAD30 10279F	Display 42 ci On 21 ci Search Type 21 ci Bus 21 ci Mark On 21 ci Peripheral Channel 21 ci Phase 10 ci Command Header Command Opcode 10 ci	As op EE 76 Act on Event C Source III 35 87 01 DB AS A2 66 Bus 6650 (eSP) C 2 0 EB SIRS DS 25 E2 AS 52 E5 A3 5C h Response Without Header Cycle Type	Results Plot Table More Search 1 Bus: eSPI Search: Bus
3 -87,7616 9 -82,293 42,293 -76,718 2 -75,494 8 -72,708 1 -71,008 1 -77,008 5 -68,235 5 -68,235 5 -68,235 5 -65,946 3 -65,946 3 -65,296 9 -62,2925 0 -61,212 0 -61,212 0 -61,212 0 -61,212 0 -61,212 0 -61,212 0 -61,212 0 -61,212 0 -61,212 0 -61,212 0 -61,212 0 -61,212 0 -61,212 0 -61,212 0 -61,212 0 -61,212 0 -61,212 0 -61,212	82µs - 82µs CET_PC 928µs - 66µs PUT_NP 960µs F 910µs PUT_NP 918µs - 918µs - 918µs - 918µs - 918µs - 919µs GET_NP 931µs - 90µs PUT_NP 91µs -	Memory Write 64 Memory Write 64 Memory Read 32 Successful Completion With Data Memory Read 64 Successful Completion With Data Memory Read 32 Memory Read 64	Tag:0 Length:018 Tag:1 Length:018 Tag:1 Length:00D Tag:0 Length:007 Tag:4 Length:007 Tag:4 Length:007 Tag:0 Length:009 Tag:2 Length:001	668277 B6C508 64F787 D32CF0 5CAD31 10279F	Command Opcode	Act on Event C Source III S 67 DD Do AS ACTOR Bus 6650 (cSPI) V All 52 ES AS SC h Response Without Header	Table Piot Search 1 Bus; eSPI Search: Bus
a -82.669 b -82.299 c -76.718 c -75.784 d -72.708 d -72.708 d -72.708 d -72.708 d -72.708 d -72.708 d -72.08 d -72.08 d -72.09 d -72.09 d -72.08 d -72.08 d -72.08 d -72.09 d -72.08 d -72.08 <td>Чµы GET_PC 28µь - 167µь PUT_NP 08µь PUT_NP 18µь - 04µь GET_NP 05µь - 33µь GET_NP 33µь - 05µь - 05µь - 33µь - 05µь - 35µь - 35µь - 35µь -</td> <td> Memory Write 64 Memory Read 32 Successful Completion With Data Memory Read 64 Successful Completion With Data Memory Read 32 Memory Read 64</td> <td></td> <td> B6C500 64F7B7 D32CF0 5CAD30 5CAD30 10279F</td> <td>On E Search Type 21 22 Bus V Mark On SVEE Peripheral Channel V Phase Response Wi Header Command Opcode</td> <td>Act on Event C Source III S 67 DD Do AS ACTOR Bus 6650 (cSPI) V All 52 ES AS SC h Response Without Header</td> <td>Search 1 Bus: eSPI Search: Bus</td>	Чµы GET_PC 28µь - 167µь PUT_NP 08µь PUT_NP 18µь - 04µь GET_NP 05µь - 33µь GET_NP 33µь - 05µь - 05µь - 33µь - 05µь - 35µь - 35µь - 35µь -	Memory Write 64 Memory Read 32 Successful Completion With Data Memory Read 64 Successful Completion With Data Memory Read 32 Memory Read 64		 B6C500 64F7B7 D32CF0 5CAD30 5CAD30 10279F	On E Search Type 21 22 Bus V Mark On SVEE Peripheral Channel V Phase Response Wi Header Command Opcode	Act on Event C Source III S 67 DD Do AS ACTOR Bus 6650 (cSPI) V All 52 ES AS SC h Response Without Header	Search 1 Bus: eSPI Search: Bus
	228µ5 67µ5 PUT_NP 106µ5 - 84µ5 PUT_NP 18µ5 - 50µ5 - 33µ5 - 33µ5 - 50µ5 - 50µ5 - 50µ5 PUT_PC 35µ5 -	Memory Read 32 Successful Completion With Data Memory Read 64 Successful Completion With Data Memory Read 32 Memory Read 64	Tag:1 Length:00D Tag:0 Length:007 Tag:1 Length:007 - Tag:2 Length:009 - Tag:2 Length:001	B6C500 64F7B7 D32CF0 5CAD30 10279F	Bus v Mark On Peripheral Channel v Phase Command Response Wi Header Command Opcode	Bus 6650 (eSP) v A 6650 (eSP) v A 652 E5 A 3 SC h Response Without Header Cycle Type	Search 1 88 Bus: eSPI Search: Bus
1 -76.7180 2 -75.9494 3 -72.7200 4 72.7008 5 -68.235 5 -67.8650 7 -65.9763 9 -62.925 0 -61.2123 8 -65.9763 9 -61.2123 8 -65.9763 9 -61.2123	b67us PUT_NP 066µs ~ 88µs PUT_NP 188µs ~ 905µs CET_NP 303µs GET_NP 31µs ~ 70ys PUT_PC 235µs ~	Memory Read 32 Successful Completion With Data Memory Read 64 Successful Completion With Data Memory Read 32 Memory Read 64	Tag:1 Length:00D Tag:0 Length:007 Tag:1 Length:007 - Tag:2 Length:009 - Tag:2 Length:001	64F7B7 D32CF0 5CAD31 10279F	Bus v Mark On Peripheral Channel v Phase Command Response Wi Header Command Opcode	Bus 6650 (eSP) v A 6650 (eSP) v A 652 E5 A 3 SC h Response Without Header Cycle Type	Bus: eSPI Search: Bus
2 -75.4940 8 72.7208 1 -71.008 5 -68.255 5 -67.8655 7 -65.966 3 -65.976 9 -62.925 9 -61.2122 1 -6.0427 Waveform View	H06µs 880µs PUT_NP 118µs - 90µs GET_NP 85µs - 33µs GET_NP 31µs - 07µs PUT_PC 125µs -	Successful Completion With Data Memory Read 64 Successful Completion With Data Memory Read 32 Memory Read 64	Tag:6 Length:00D Tag:D Length:007 Tag:4 Length:007 Tag:2 Length:009 Tag:2 Length:001	 D32CF0 5CAD31 10279F	Ark On Peripheral Channel V Phase Phase Response Wir Command Decode	E9 96 C7 72 C7 EB 38 B5 D5 25 E2 P A9 52 E5 A3 SC P Mithout Header Cycle Type	Bus: eSPI Search: Bus
3 -72.7206 4 -72.008 5 -70.0815 5 -67.3855 7 -65.9463 3 -65.7562 9 -62.9252 1 -61.212 5 -60.9463 4 -60.9463 5 -62.9252 5 -60.9463 5 -62.9252 5 -60.9463 5 -61.212 5 -60.9463 5 -60.9463 5 -61.212 5 -60.9467 Vaveform -10.9464 5 -60.9464 5 -60.9464 5 -60.9464 5 -60.9464 5 -60.9464 5 -70.9464 5 -70.9464 5 -70.9464 5 -70.9464 5 -70.9464 5 -70.9464 6 -70.9464	88µs PUT_NP 18µs 504µs GET_NP 533µs GET_NP 533µs 507µs PUT_PC 135µs	Memory Read 64 Successful Completion With Data Memory Read 32 Memory Read 64	Tag:D Length:007 Tag:4 Length:007 Tag:C Length:009 Tag:2 Length:001	 5CAD3I 10279F	Peripheral Channel V DS Phase Command Response Wi Header Command Opcode	h Response Without Header Cycle Type	Search: Bus
4 -71.0081 5 -68.2350 6 -67.8650 7 -65.9463 8 -65.5763 9 -62.9250 0 -61.2122 0 -71.210 <td>818µs 604µs GET_NP 959µs 133µs GET_NP 931µs 007µs PUT_PC 935µs </td> <td>Successful Completion With Data Memory Read 32 Memory Read 64</td> <td>Tag:4 Length:007 Tag:C Length:009 Tag:2 Length:001</td> <td> 5CAD3I 10279F</td> <td>Peripheral Channel D S Phase Command Response Wi Header Command Opcode</td> <td>h Response Without Header Cycle Type</td> <td></td>	818µs 604µs GET_NP 959µs 133µs GET_NP 931µs 007µs PUT_PC 935µs	Successful Completion With Data Memory Read 32 Memory Read 64	Tag:4 Length:007 Tag:C Length:009 Tag:2 Length:001	 5CAD3I 10279F	Peripheral Channel D S Phase Command Response Wi Header Command Opcode	h Response Without Header Cycle Type	
567.8650 7 - 65.9463 8 - 65.5763 9 - 62.9250 9 - 61.9235 Waveform View	604µs GET_NP 505µs - 333µs GET_NP 331µs - 507µs PUT_PC -	 Memory Read 32 Memory Read 64	 Tag:C Length:009 Tag:2 Length:001	5CAD3I	Phase Command Response Wi Header Command Opcode	h Response Without Header Cycle Type	
5 -67.8650 7 -65.9463 8 -65.5763 9 -62.9250 0 -61.2123 0 -60.0267 Waveform View	505µs 533µs GET_NP 531µs 507µs PUT_PC 235µs	 Memory Read 64	 Tag:2 Length:001	 10279F	Command Header	Without Header Cycle Type	
765.9463 365.5763 9 - 62.9250 061.2123 	333µs GET_NP 331µs 507µs PUT_PC 235µs	 Memory Read 64	 Tag:2 Length:001	 10279F	Command Opcode	Cycle Type	
8 -65.5763 9 -62.9250 0 -61.2123 0 -61.2123 0 -61.2123 0 -659-CMD 659-CMD +1 659-CMD +1	531µs 507µs PUT_PC 235µs			10279F	7/	P	
e -62.925() -61.2123 -60.0267 Waveform View 650-CMD - 1 - 1	07μs PUT_PC 235μs				PUT NP V		
0 -61.2125 Naveform View	235µs	-	-		89 FE	Memory Read 64 🔹	
Aveform View					Binary	Hex	
650-CMD					Tag XXXX	x	
eSPI		10.00x zoom) Vertical Zoom 1 1	D32CF00634899EE1h		Binary XXXX XXXX XXX XXXX	XX XX XX XX XX XX XX XX	
-73.2 µs n 1 Ch 2 200 mV/div MQ 1 MQ			Алтонин А. 19 АЛТАН АЛТАН И СТИЛИЦИИ И СТИЛИЦ		20.4 µs -70 µ Horizontal 32 µs/div 320 µs	Settings to Trigger	offline

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)

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

Bus Decode Bus 1 (eSPI) Index												?		
											SEARCH 1		Add M	New
											Display	113 Packets Decoded	Cursors	Callout
	Start Time	Command OpCode (h)	Cyclepe (h)	Header (h)	Address (h)	Data (h)	Response (h)	Status (h)	CRC (h)	Error	On	Act on Event 🛛 🖉		
1	-527.0141µs	PUT_MEMWR32_SHORT 1BYTE	-	-	6F9379A7	7D		-	37	-	Search Type Source		Measure	Search
2	-523.3821µs	-					Phase:48 M	338C	04		Bus v Bus 1	eSPI) 🔻	Results	Plot
3	-520.4141µs	GET_PC							07	-	Mark On		Table	
4	-518.7821µs	-	Memory Wri	Tag:3 Lengt	B6F55739	C6 ED 1F E2	. Phase:48 M	2345	1A	-				More
5	-489.0141µs	PUT_VWIRE		VWC:1E		VWI:5E VW			C9	-	End 🔻			
6	-462.9821µs	-		-			Phase:88 M	3124	37	-			Search 1	B1
7	-460.0141µs	GET_STATUS		-				-	FB	-			Bus: eSPI Search: Bu	v 21
8	-458.3821µs	-	-	-			Phase:08 M	3185	C8	-			Events: 56	
9	-455.4141µs	PUT_MEMRD32_SHORT		-	BF0BCA59		-	-	F2	-				
10	-452.1821µs	-				3B 33	Phase:48 M	33AC	D3					
11	-448.4141µs	GET_FLASH_NP	-	-	-	-	-	-	3F	-				
12	-446.7821µs	-	Flash Write	Tag:0 Lengt	ACEAFB63	D7 7A 72 A	Phase:C8 M	1305	7E	-				
13	-410 6141us	PUT_MEMWR32_SHORT_IBYTE			6F9379A7	70			37					
Et Date Horizontal Z D7 D6 D5 R1 D4				паттылжыкалын.гт 0 µs	-20 µs	ארגנאגריר האנייער איז	ากแกนแก่สุรักรณฑา		ന്നാവുംബം		Copy Trigger Settings to Search	Copy Search Settings to Trigger		
Ref 1 Digital 125 MS/s Espi_Dual	89 μs Bus 1 eSPI	X X X S::	2345h		92 µs	2 3	^{33 μs} 4 5		8 A	95 µs 95 µs dd Add Add ew New New DVI nth Ref Bus	96 µs 97 µs Horizontal 200 µs SFc 625 GSA 160 pc/st	Acquisition	alyze	Offline Apr 2021

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

Ordering information

Protocol Bundles

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

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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	~	*	*
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, LIN, FlexRay). Enables triggering on packet-level information on CAN/CAN FD/LIN/FelxRay	V	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	~	~	~
SRNRZ	NRZ Serial Decoding and Analysis. Supports NRZ with normal and inverted polarity with Bit order (MSB or LSB first)	~	~	~
SRPM	Power Management Serial Triggering and Analysis. Enables triggering on packet-level information on SPMI buses	~	~	~
SRUSB2	USB 2.0 Serial Triggering and Analysis (LS, FS, HS). Enables triggering on packet-level information on USB 2.0 buses	~	~	~
SRMDIO	MDIO Protocol Decoder and Search. Extensive search options.	V	~	v
SRSVID	SVID Protocol Decider and Search. Supports version rev.1.92. Extensive search options	~	~	~
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
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

Master Bundle for Military, 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	v	*	*
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.	V	V	V
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	V	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.

Serial bus type	3 Series MDO Option	4 Series MSO Option	5 Series MSO Option	6 Series MSO Option	Description
NRZ	N/A	4-SRNRZ	5-SRNRZ	6-SRNRZ	NRZ Serial Decoding and Analysis. Enables decoding and searching the packet-level information on buses with analytical tools such as digital views of the signal, bus views, packet decoding, search tools, and packet decode tables with time stamp information. Variants like NRZ-I, NRZ-M, NRZ-S, and NRZ-C are not supported currently. Supports only NRZ with normal and inverted polarity with Bit Order (MSB or LSB First).
CAN, CAN FD, LIN, FlexRay	3-SRAUTO	4-SRAUTO	5-SRAUTO	6-SRAUTO	Automotive Serial Triggering and Analysis (CAN, CAN FD, LIN, FlexRay). Enables triggering on packet-level information on CAN/CAN FD/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.

Serial bus type	3 Series MDO Option	4 Series MSO Option	5 Series MSO Option	6 Series MSO Option	Description
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 (LS, FS, HS). 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.
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.
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

To upgrade an already purchased instrument

Serial bus ³	3 Series MDO Node-Locked License ⁴	4 Series MSO Node-Locked/ Floating License	5 Series MSO Node-Locked/ Floating License	6 Series MSO Node-Locked/ Floating License	
MIL-STD-1553, ARINC 429	SUP3 SRAERO	SUP4-SRAERO	SUP5-SRAERO	SUP6-SRAERO	
		SUP4-SRAERO-FL	SUP5-SRAERO-FL	SUP6-SRAERO-FL	
I ² S, LJ, RJ, TDM	SUP3 SRAUDIO	SUP4-SRAUDIO	SUP5-SRAUDIO	SUP6-SRAUDIO	
		SUP4-SRAUDIO-FL	SUP5-SRAUDIO-FL	SUP6-SRAUDIO-FL	
CAN, CAN FD, LIN, FlexRay	SUP3 SRAUTO	SUP4-SRAUTO	SUP5-SRAUTO	SUP6-SRAUTO	
		SUP4-SRAUTO-FL	SUP5-SRAUTO-FL	SUP6-SRAUTO-FL	
8B10B	N/A	N/A	SUP5-SR8B10B	SUP6-SR8B10B	
			SUP5-SR8B10B-FL	SUP6-SR8B10B-FL	
NRZ	N/A	SUP4-SRNRZ	SUP5-SRNRZ	SUP6-SRNRZ	
		SUP4-SRNRZ-FL	SUP5-SRNRZ-FL	SUP6-SRNRZ-FL	
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	
Serial analysis bundle ⁵	SUP3 BND	N/A	N/A	N/A	
Serial analysis bundle ⁵ Table continued	SUP3 BND	N/A	N/A		

Table continued...

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

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

 $^{^{5}\;}$ 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	
PSI5	N/A	SUP4-SRPSI5	SUP5-SRPSI5	SUP6-SRPSI5	
		SUP4-SRPSI5-FL	SUP5-SRPSI5-FL	SUP6-SRPSI5-FL	
MDIO	N/A	SUP4-SRMDIO	SUP5-SRMDIO	SUP6-SRMDIO	
		SUP4-SRMDIO-FL	SUP5-SRMDIO-FL	SUP6-SRMDIO-FL	
SVID	N/A	SUP4-SRSVID	SUP5-SRSVID	SUP6-SRSVID	
		SUP4-SRSVID-FL	SUP5-SRSVID-FL	SUP6-SRSVID-FL	
e-USB2	N/A	SUP4-SREUSB2	SUP5-SREUSB2	SUP6-SREUSB2	
		SUP4-SREUSB2-FL	SUP5-SREUSB2-FL	SUP6-SREUSB2-FL	
DPHY	N/A	N/A	SUP5-SRDPHY	SUP6-SRDPHY	
			SUP5-SRDPHY -FL	SUP6-SRDPHY-FL	
MANCHESTER	N/A	SUP4-SRMANCH	SUP5-SRMANCH	SUP6- SRMANCH SUP6-	
		SUP4-SRMANCH-FL	SUP5-SRMANCH-FL	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	
СХРІ	N/A	SUP4-SRCXPI	SUP5-SRCXPI	SUP6-SRCXPI	
		SUP4-SRCXPI-FL	SUP5-SRCXPI-FL	SUP6-SRCXPI-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

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.

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

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

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

Bandwidth	Probes		Option	MSO Option	Description
500 MHz	Standard probes of MSO5/6 series	Reference Selling. Contact:	PGY-RFFE	PGY-RFFE	RFFE Protocol Trigger & Decode Analysis Software.
		hno.com			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.
500 MHx and above	standard probes	Reference Selling. Contact: contact@prodigytec hno.com	PGY-I2S	PGY-12S	I2S Electrical, Audio and Protocol Testing SW
500 MHz and above	standard probes	Reference Selling. Contact: contact@prodigytec hno.com	PGY-I2C	PGY-I2C	I2C Electrical Validation and Protocol decode SW
500 MHz and above	standard probes	Reference Selling. Contact: contact@prodigytec hno.com	PGY-SPI	PGY-SPI	SPI Electrical Validation and Protocol decode SW
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
-	500 MHx and above 500 MHz and above 500 MHz and above	500 MHx and above standard probes 500 MHz and above standard probes 500 MHz and above standard probes 500 MHz and above standard probes	MSO5/6 seriesContact: contact@prodigytec hno.com500 MHx and abovestandard probesReference Selling. Contact: contact@prodigytec hno.com500 MHz and abovestandard probesReference Selling. Contact: contact@prodigytec	500 MHz MSO5/6 series Contact: contact@prodigytec hno.com Contact: contact@prodigytec hno.com 500 MHz and above standard probes Reference Selling. Contact: contact@prodigytec hno.com PGY-I2S 500 MHz and above standard probes Reference Selling. Contact: contact@prodigytec hno.com PGY-I2S 500 MHz and above standard probes Reference Selling. Contact: contact@prodigytec hno.com PGY-I2C 500 MHz and above standard probes Reference Selling. Contact: contact@prodigytec hno.com PGY-I2C 500 MHz and above standard probes Reference Selling. Contact: contact@prodigytec hno.com PGY-SPI 500 MHz and above standard probes Reference Selling. Contact: contact@prodigytec hno.com PGY-I3C 500 MHz and above standard probes Reference Selling. Contact: contact@prodigytec PGY-I3C	MSO5/6 series Contact: contac

Serial bus type	Minimum Bandwidth	Recommended Probes	Ordering	5 Series MSO Option	6 Series/6B Series MSO Option	Description
JTAG	500 MHz and above	standard probes	Reference Selling. Contact: contact@prodigytec hno.com	PGY-JTAG	PGY-JTAG	JTAG Protocol decode Software
ONFI	4 GHz and above	Contact Prodigy	Reference Selling. Contact: contact@prodigytec hno.com	PGY-ONFI	PGY-ONFI	ONFI Electrical Timing Analysis Sw
SPMI	500 MHz and above	standard probes	Reference Selling. Contact: contact@prodigytec hno.com	PGY-SPMI	PGY-SPMI	SPMI Protocol Decode Software
MPHY	16 GHz and above	Contact Prodigy	Reference Selling. Contact: contact@prodigytec hno.com	PGY-UPRO	PGY-UPRO	MIPI MPHY -UniPro/LLI/UFS Protocol Decode Sw
				PGY-LLI	PGY-LLI	
				PGY-UFS(needs PGY-UPRO)	PGY-UFS(needs PGY-UPRO)	
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

Serial bus type	Minimum Bandwidth	Recommended Probes	Ordering		6 Series/6B Series MSO Option	Description
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 registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.

Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.



GPIB IEEE-488

Product Area Assessed: The planning, design/development and manufacture of electronic Test and Measurement instruments.

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> 2 Jun 2021 61W-61101-11 www.tek.com

