D9010MILP
Military Protocol Trigger and Decode
for Infiniium Oscilloscopes

The D9010MILP software package for Infiniium oscilloscopes gives you the ability to trigger and decode SpaceWire, ARINC429 and MIL-STD-1553 signals. This package applies to all Infiniium Oscilloscopes.
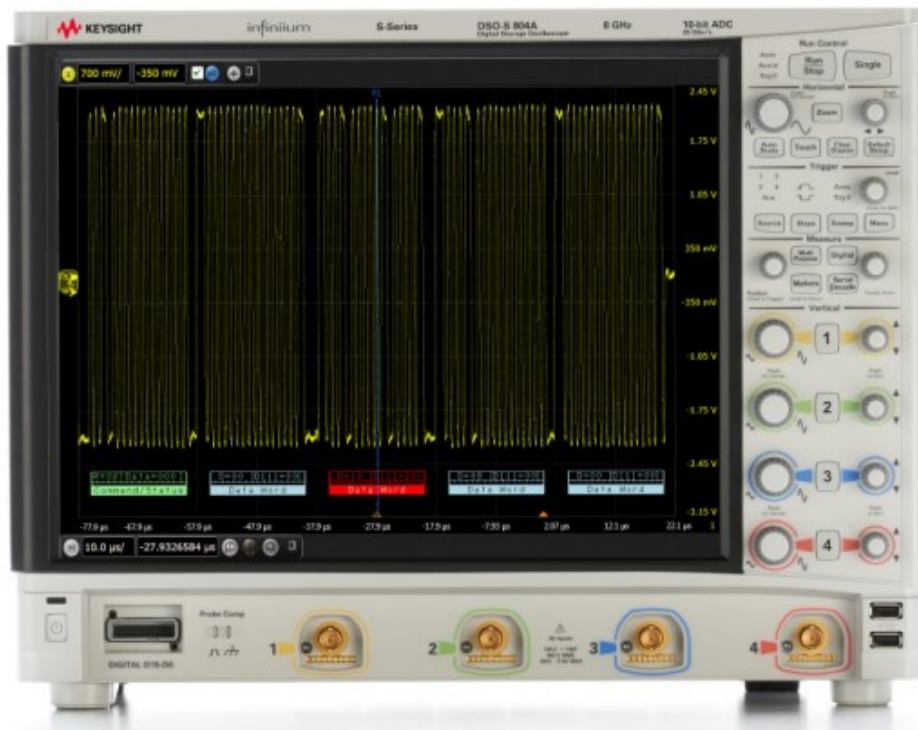

KEYSIGHT
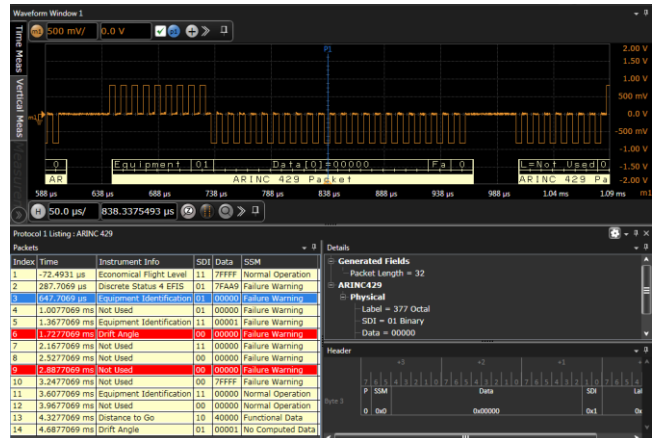TECHNOLOGIES

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Product overview

The ARINC 429 bus and the MIL-STD-1553 bus are serial buses used in both commercial and military equipment. While primarily used in avionics, these buses are also found in ground vehicles, weapons systems and other equipment. Because of their importance in both industry and defense, error free operation of both the ARINC 429 bus and the MIL-STD-1553 bus is crucial.

SpaceWire is a spacecraft communication network based in part on the IEEE 1355 standard of communications. It is coordinated by the European Space Agency (ESA) in collaboration with international space agencies including NASA, JAXA and RKA. SpaceWire supports highly fault-tolerant networks and systems, which is one reason for its popularity. SpaceWire is a standard for high-speed links and networks for use onboard spacecraft, easing the interconnection of sensors, mass-memories, processing units, and downlink telemetry sub-systems.

Without intelligent oscilloscope serial bus protocol triggering and decode, it can be difficult to debug these buses and validate signal integrity. Traditional methods of debugging serial buses include manual bit counting, which

Protocol decoding of ARINC 429 showing a real time trace, protocol decoding table, and packet details using a symbolic decode.

Protocol decoding of MIL-STD-1553 showing a real time trace, protocol decoding table, and packet details using a symbolic decode.

is not only tedious, but prone to critical errors. Easily debug and test these serial buses through D9010MILP Protocol Triggering and Decode for Infiniium Oscilloscopes. This application provides an easy to use interface, a breadth of protocol decode options to suit your specific needs, pattern and error search options to find errors faster, and much more.

- Set up your scope to show protocol decode in less than 30 seconds
- Get access to a rich set of integrated protocol-level triggers
- Save time and eliminate errors by viewing packets at the protocol level
- Use time-correlated views to quickly troubleshoot serial protocol problems back to their timing or signal integrity root cause
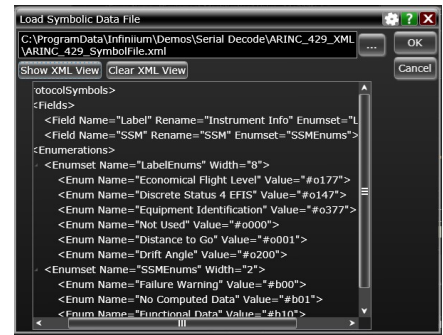
ARINC 429

ARINC (Aeronautical Radio INC.) 429 is a data transfer standard for aircraft avionics. It uses a self-clocking, self-synchronizing data bus protocol (Tx and Rx are on separate ports). The physical connection wires are twisted pairs carrying balanced differential signaling. The protocol allows for self-clocking at the receiver end, thus eliminating the need to transmit clocking data. ARINC 429 is an alternative to MIL-STD-1553.
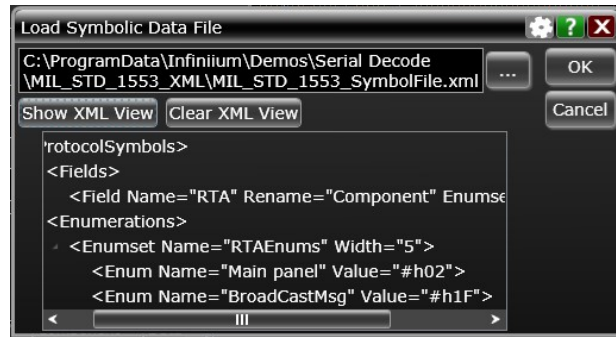

Symbolic decode XML file for ARINC 429

Specifications and Characteristics	
Signal sources	Any analog channel Any waveform memory Any waveform math
Signal types	Differential (A-B) Line A (non-inverted) Line B (inverted)
Baud rates	High (100 kbps) Low (12.5 kbps) User-defined
Auto setup	Automatically configures trigger levels, decode thresholds, sample rate, memory depth, holdoff, and trigger

Decode options	Word Format:
	    Label/Data
	    Label/SSM/Data
	    Label/SSM/Data/SDI
	Symbolic decode available: add labels to waveforms to customize decode formats for all fields using an XML file. All fields can have their values translated to strings. Default formats are:
	    Label format: octal
	    SDI format: binary
	    Data format: Hex, decimal, binary, ASCII
	    SSM format: binary
	    Error format: ASCII

Trigger options	ARINC 429 packet: label, SDI, data, SSM, parity Label range: user defined Bits specific: word stop, word start, any 0 bits, any 1 bits, any bits Errors: gap, parity, word, word or gap, or any error

MIL-STD-1553

MIL-STD-1553 was originally designed as an avionic data bus for use with military avionics, but has also become commonly used in spacecraft subsystems, both military and civil. It features multiple redundant balanced line physical layers, a differential network interface, time division multiplexing, half-duplex command/response protocol, and can handle up to 30 Remote Terminals (devices). A single bus consists of a wire pair with 70–85 Ω impedance at 1 MHz.
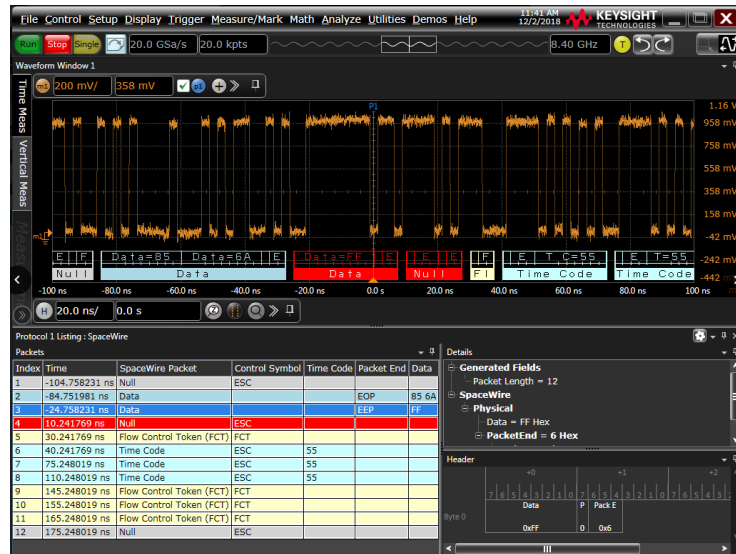

Symbolic decode XML file for MIL-STD-1553

Specifications and Characteristics	
Signal sources	Any analog channel Any waveform memory Any waveform math
Protocols supported	MIL-STD-1553A MIL-STD-1553B
Baud rates	1 Mbps (automatic)
Auto setup	Automatically configures trigger levels, decode thresholds, sample rate, memory depth, holdoff, and trigger

Decode options	Symbolic decode available: add labels to waveforms to customize decode formats for all fields using an XML file. All fields can have their values translated to strings. Default formats are:
	    Packet format: ASCII
	    RTA format: Hex
	    Data format: Hex, decimal, binary, ASCII

Trigger options	Command/status word: component, data, parity Data word: data, parity Specific events: data word and command/status word start/stop Errors: parity error, sync error, Manchester error, any error

SpaceWire

SpaceWire utilizes asynchronous communication and allows speeds between 2 Mbit/s and 400 Mbit/s, with initial signaling rate of 10Mbit/s. SpaceWire also has very low error rates, deterministic system behavior, and relatively simple digital electronics. SpaceWire is bi-directional, using two twisted pairs in each direction.

Protocol decoding of SpaceWire showing a real time trace, protocol decoding table, and packet details.

Specifications and Characteristics

Signal sources	Any analog channel Any waveform memory Any waveform math
Signal types	Differential (A-B) Line A (non-inverted) Line B (inverted)
Baud rates	User-defined (2 Mbps to 400 Mbps)
Auto setup	Automatically configures trigger levels, decode thresholds, sample rate, memory depth, holdoff, and trigger
Decode options	View nulls: yes or no Sync mode: nulls, pattern, automatic Null count: 1 to 4
Trigger options	Any packet Control characters: FCT, ESC, EEP, EOP, any Control codes: null, time code Data (up to two bytes) Errors (parity, escape, any)

Ordering Information and Related Literature

Recommended oscilloscopes

The protocol triggering and decode software is compatible with any bandwidth Keysight Infiniium Series oscilloscopes with operating software revision 6.30 or higher.

Flexible Software Licensing and KeysightCare Software Support Subscriptions

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License Terms

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Node-locked – License can be used on one specified instrument/computer.
Transportable – License can be used on one instrument/computer at a time but may be transferred to another using Keysight Software Manager (internet connection required).
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Step 1. Choose your software product (eg. D9020AUTP).
Step 2. Choose your license term: perpetual or time-based.
Step 3. Choose your license type: node-locked, transportable, USB portable, or floating.
Step 4. Depending on the license term, choose your support subscription duration.

Examples

If you selected:	Your quote will look like:	
D9020AUTP node-locked perpetual license with a 12-month support subscription	**Part Number**	**Description**
	D9020AUTP	High Speed Automotive Decode and Trigger Software
	R-B5P-001-A	Node-locked perpetual license
	R-B6P-001-L	KeysightCare software support subscription, node-locked–12 months
D9020AUTP transportable time-based 6-month license	**Part Number**	**Description**
	D9020AUTP	High Speed Automotive Decode and Trigger Software
	R-B4P-001-F	6-months, node-locked KeysightCare software support subscription

To configure your product and request a quote:
http://www.keysight.com/find/software
Contact your Keysight representative or authorized partner for more information or to place an order:
www.keysight.com/find/contactus

Related literature

Type	Description / URL
Brochure	Infiniium S-Series (500 MHz to 8 GHz real time oscilloscope)
Brochure	Infiniium V-Series (8 GHz to 33 GHz real time oscilloscope)
Data Sheet	Infiniium UXR Series (13 GHz to 110 GHz real time oscilloscope)
Brochure	30 Things Only Infiniium Oscilloscopes Can Do

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