

# iSAFT Recorder

## SPACEWIRE / MIL-STD-1553 / CAN



**Record,**  
**Observe,**  
**Validate!**

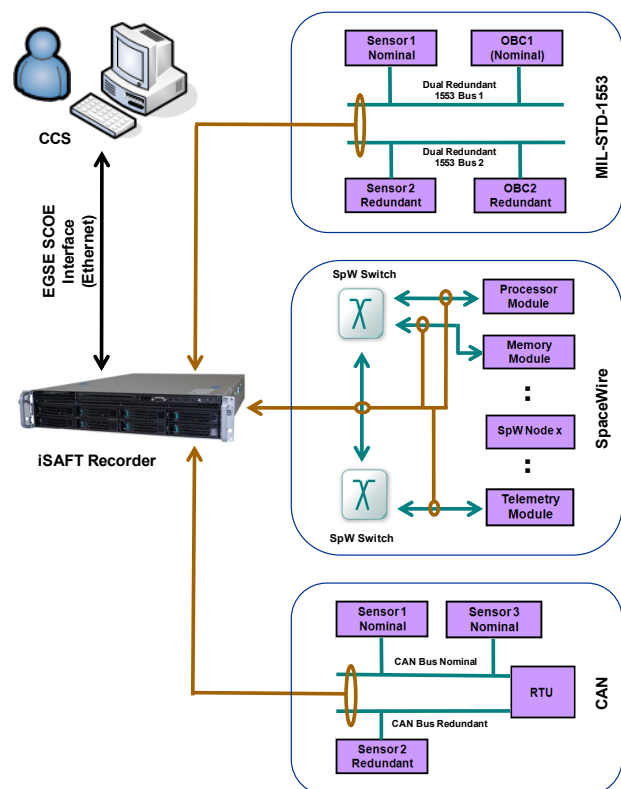


*iSAFT SpaceWire / MIL-STD-1553 / CAN Recorder is an advanced, integrated, high performing, modern network traffic capture, recording and analysis tool for the validation of satellite/spacecraft on-board communication protocols and data networks implementing the SpaceWire, MIL-STD-1553 and/or CAN protocol family.*

The iSAFT SpaceWire / MIL-STD-1553 / CAN Recorder is capable of capturing data packets on multiple SpaceWire links, MIL-STD-1553 and/or CAN buses, time stamping, recording, and delivering them to a powerful Protocol Analyzer for further processing & analysis. Operating on a multi-Gbytes powerful HW platform, the SW environment is based on the iSAFT graphical tool chain, thus allowing the management, filtering & searching of the recordings. It is used for troubleshooting and problem solving at various development stages, minimizing the impact on cost and schedule.

### FEATURES

- Powerful HW platform (high processing power, up to Tbytes storage capacity), advanced file and recordings management (auto-archive, disk cleanup, file system and disk optimization, etc.).
- iSAFT graphical tool chain (Runtime engine, iSAFT Console, offline analysis with the Wireshark Protocol Analyzer, recordings management).
- Capturing & recording of large volumes of traffic from multiple SpaceWire links, MIL-STD-1553 and/or CAN buses.
- Off-line analysis of multi-gigabyte traffic logs. Chronological merging of recorded traffic (i.e. from SpaceWire, 1553 and CAN) for complex topologies.
- Event-trace trigger & selective tracing (filtering) support, available plug-ins and statistics for various protocols.
- Graphical tools for local/remote control, data recording, managing, searching and filtering the recordings.
- Export of traffic recordings to XML, PostScript®, CSV, or plain text, user selected protocol fields per packet.
- Interfaces with EGSE Central Checkout System.
- Open APIs to 3rd-party applications, support for customization, adaptations to customer needs.



Based on an open architecture and modular design, iSAFT Recorder is a future-safe, cost-effective and already validated solution for demanding EGSE activities. One iSAFT Recorder station can **simultaneously record data from different networks**, store data on its hard disks, manage recorded files, interface to Central Checkout System (CCS) through EGSE SCOE interfaces, etc. It completely replaces the need for multiple separated elements in your testbed (dedicated SpaceWire or 1553 or CAN recorders, separate IRIG receivers/sources, dedicated stations for data recording and connection to CCS, etc.). It is fully compliant with all standards and certifications required to install it on a flight equipment/mission EGSE (FMEA, hazard/safety analysis, CE compliance, etc.).



## iSAFT SPACEWIRE RECORDER

### General Features

- Unobtrusive link monitoring (8-16 ports, 4-8 links).
- Continuous real-time capture from 2 to 250 Mbps per port.
- Enable/disable traffic capture per port.
- User selectable capture triggers/filters.
- Decoding of SpW, RMAP, PTP, CCSDS Space Packet protocols.
- Raw and decoded packets display.
- IRIG generator or receiver operation.
- Down to 8 nsec Timestamp Resolution.
- Packet/Character monitoring modes per port, including erroneous characters.
- Truncation of packets exceeding a user programmable size.

No.	Time	Protocol	Port	Length	SpW Path Addresses	SpW Logical Address	SpW Protocol ID	1553 Type
2680	2.126789736	spacewire	SpwPort4	97	11,12,13,14,15	41	Remote Memory Access Protocol	
2681	2.126797744	spacewire	SpwPort4	89	1,2,3	42	3	
2682	2.126805024	spacewire	SpwPort4	60019		204	203	
2683	2.130578832	1553	1553Ch0	40				Mode code
2684	2.130627312	1553	1553Ch0	164				BC-RT
2685	2.131320512	1553	1553Ch0	164				BC-RT
2686	2.131434264	spacewire	SpwPort5	41	1,2,3	40	Remote Memory Access Protocol	
2687	2.131436520	spacewire	SpwPort5	97	11,12,13,14,15	41	Remote Memory Access Protocol	
2688	2.131444528	spacewire	SpwPort5	89	1,2,3	42	3	
2689	2.131451872	spacewire	SpwPort5	60019		173	172	

Frame 2671: 40 bytes on wire (320 bits), 40 bytes captured (320 bits)

Frame Information

- Frame type: 1553 Packet (11)
- Port name: 1553Ch0

1553 PROTOCOL

- Packet Information

### Filters

- Traffic between programmable Time-Codes.
- User selectable SpaceWire characters.
- User programmable packet pattern.
- Packet pattern filter inversion.
- Ignoring of path address field for traffic capture between SpaceWire switches.

### Triggers

- Independently selectable triggers per port.
- Independent triggers for start/stop of capture.
- IRIG time-stamp.
- User selectable SpaceWire Character, User defined packet pattern.

### Statistics

- Real-time statistics display.
- Total captured Packets (EoP & EEP terminated).
- EEP terminated packets.
- Escape, Parity errors, Number of Disconnects.
- Captured bytes, Packets/Bytes per second, Packets size distribution.
- Captured Signalling Codes (statistics for Time-Code, Interrupts, unassigned Signalling Codes).
- Pause/continue the display of statistics without affecting the logging of statistics, if active.
- Snapshot/export to XML, CSV, plain text, other.

SpaceWire Statistics				
General				
Station name	Default Station	Default Station	Default Station	Default Station
Board name	SpwBoard0	SpwBoard0	SpwBoard0	SpwBoard0
Port name	SpwPort0	SpwPort1	SpwPort2	SpwPort3
Monitoring level	Packet	Packet	Character	Character
Total packets (EoP & EEP-terminated)	1,577,039	1,576,895	532	197,381
Valid packets (EoP-terminated)	1,577,037	1,576,893	532	197,381
Total bytes (Data characters)	1,829,079,558	1,828,929,633	548,848	203,894,300
Total packets/sec	0	0	0	0
Total bytes/sec	0	0	0	0
Control and character codes				
Total signalling codes	0	0	0	0
Time codes	0	0	0	0
Interrupts (NTR)	0	0	0	0
Interrupt acknowledgments (NTA)	0	0	0	0
Signalling code 01	0	0	0	0
Signalling code 11	0	0	0	0
FCTs	203,832,165	203,813,401	68,673	25,511,461
Nulls	189,942,678	171,186,975	0	0
Errors				
Error packets (EEP-terminated)	2	2	0	0
Esc errors	0	0	0	0
Parity errors	1	2	0	0
Disconnects	2	2	0	0



## iSAFT 1553 RECORDER

### General Features

- Recording of Fully Loaded Buses for Long Durations.
- Decoders can display any Protocol Field and Messages Timing Information.
- Real Time Analysis of Recorded Messages and Detailed Statistics View.
- Triggers to Start Monitoring on specific Events.

### Statistics

- General Statistics: Total Messages, Good Messages, Error Messages, No Responses and Spurious Data.
- Timing Statistics: Messages/second, Bus Loading.
- Message Type Statistics: Commands received, BCRT, RTBC, RTRT, Mode Codes, Broadcast BCRT, Broadcast RTRT, Broadcast Mode Codes.
- Message Error Statistics: Two Bus Error, Wrong RT Address Response, No Responses, Word Count, Parity, Bit Error, Bad Sync, Spurious Data.
- RT Status Response Error Statistics: Busy Bit, No Response, Message Error, Terminal Flag.
- nSA Only Statistics: Last Frequency of Variable and Min – Max values, Last Response Time and Min – Max values, Last Inter-Message Gap and Min – Max values.
- Snapshot/export to XML, CSV, plain text, other.

### Triggers

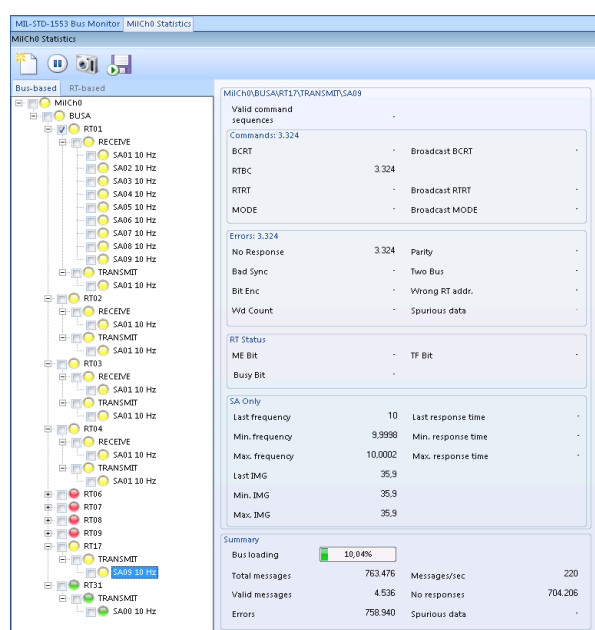
- Trigger to start BM on any Word with Mask value, on any Error, on specific Errors or based on External Trigger signal.
- Raise External Trigger signal on BM start event.

## iSAFT CAN RECORDER

### General Features

- Recording and decoding of standard ECSS-CAN / CANopen messages over CAN Buses.
- Continuous real-time capture of 2 - 4 channels.
- Down to 8 ns Timestamp Accuracy.
- ECSS-E-50-15C TIME messages monitoring and decoding.
- Can support EDS and DCF files import enabling decoding and automatic interpretation of CANopen PDO frame values & parameters.

- Online Filters for Selective Capture or Offline Filters for Post Processing.
- Statistics Logging for Offline Analysis.
- 20 nsec Timestamp Resolution.
- Decoding of standard MIL-STD-1553 Messages, ECSS-E-ST-50-13C Services' Message over 1553 Buses.



### Filters

- Online filters per any combination of RT address, Sub-Address, Transmit or Receive commands and any combination of messages' protocol fields.
- Complex offline filters using logical expressions of messages' protocol fields or timing information. (IMG, Message duration, etc.).

### Statistics

- CAN bus statistics (Bus load, Total number of received messages, Remotes frame statistics).
- CANopen statistics (SDO response times, TPDO response times, Heartbeat event times, Node Guarding response times, Bootup time statistics).

### Filters & Triggers

- CAN frame type.
- Specific errors.
- Specific CAN Ids / COB-Ids.



## HARDWARE PERIPHERALS - PHYSICAL INTERFACES

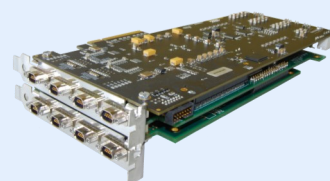
### Site Rackmount System

- 2U Rack Mounted System / Portable System
- High processing power, Heavy Duty Platform
- 256GB data storage
- 2TB data archive (expandable)
- High reliability, high MTBF
- Microsoft® Windows 64 bit
- CE, EN55022, EN55024 certifications



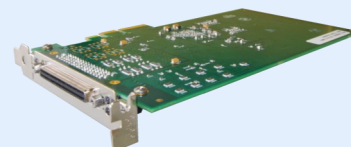
### Octal SpaceWire PCIe NIC

- Full size PCIe form factor board
- Eight SpaceWire Ports
- Link speed over 300Mbps (up to 200 Mbps for recording)
- ANSI/TIA/EIA-644-A, 100 Ohms terminated
- Standard SpaceWire 9-pins micro-miniature
- IRIG-B002 generator/receiver TTL/RS-422 electrical levels, with down to 8 nano-seconds accuracy/resolution
- Eight pins trigger IN/OUT for start of capture stimulation, generation of events, synchronization with other equipment
- Flight equipment protection against internal failures (FMEA available)



### Dual 1553 1Mbit PCIe NIC

- 1/2 Size 4 Lane PCIe board
- 2 Independent, Dual Redundant Channels (up to 4 per board)
- Transformer bus coupling, Full Error Detection
- Full Function Model: BC, BM and multiple RTs (1-32) simultaneously
- Start-up, Loop-Back, User and Periodic BIT tests
- IRIG-B002 receiver, 64-bit, 20 ns time stamp resolution
- 1 LVTTTL Input and 1 Output Trigger per Channel
- Fully Compliant to MIL-STD-1553B Notice II/IV
- Supports SAE tests



### CAN PCIe NIC

- Full size PCIe form factor board
- 2 - 4 independent high-speed CAN interfaces according to ISO11898-2
- Bit rates from 10kbit/s up to 1 Mbit/s
- High resolution timestamping accuracy down to 20ns
- IRIG-B interface support
- Error injection support, advanced CAN diagnostic



### STRENGTHS AT A GLANCE

- ✓ All-in-one recording, observation & validation environment
- ✓ Suitable for many different areas/users
- ✓ Easy integration of new protocols & interfaces
- ✓ Built on open and standard technologies
- ✓ Support of multiple networks simultaneously

### CONTACT INFORMATION

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Note: This brochure describes the full set of the iSAFT Recorder capabilities and features. Depending on specific iSAFT Recorder configurations, the supported features may vary.