Satellite Telemetry Data Recorder (STDR)

The STDR system supports simultaneous record and playback of multiple data streams over serial and network interfaces. The STDR system provides high performance, highly-configurable, multiple channels data recording, storage, and playback capabilities better than those provided by the PTP-R systems.

Each STDR system is configured with six inputs and six outputs for TTL and RS422 interfaces. It also contains six high speed ECL input and output channels which exceeds the 2 channels requirement. In addition to near real-time playback, the STDR provides an enhanced real-time playback function for all six channels.

Control and Status
» Compliant with GEM version 1.3 for remote control and status
» NOAA-ISI Epoch LEO-T driver provided
» Local GUI for control and Status

Input and Output Interfaces
» Discrete TTL, RS422, ECL and Ethernet TCP/UDP/IP servers and clients

Record Channels
» Six independent record channels
» Manual recording/Time triggered/Data quality event triggered recording
  › Start recording when data quality is good
  › Start recording when there is activity on the data line
» Supports NRZ-L, NRZ-M, NRZ-S, BiPhase-L, BiPhase-M and BiPhase-L PCM decoding schemes
» Supports 1x, 2x and 4x clock multiplication factors – each input bit is repeated one, two or four times

Playback Channels
» Six independent playback channels
» Low speed and high speed (>> 1Gbps) playback capabilities per channel
» Programmable high resolution serial output clock rate. (min. resolution is 1mHz)
» Supports external reference clock input
» Coherent clock outputs on all channels
» Supports NRZ-L, NRZ-M, NRZ-S, BiPhase-L, BiPhase-M and BiPhase-L PCM encoding schemes
» Supports 1x, 2x and 4x clock multiplication factors – each output bit is repeated one, two or four times
» Hardware Fanout – the record input and be sent back out to the playback output on the same IO card

Data Quality Monitoring
» Independent data quality monitoring for both playback and record channels
» Frame synchronizer is included in each playback/record channel

Time Stamping
» Better than 50us resolution using IRIG-B only input
» Better than 0.1us resolution using IRIG-B plus 1-PPS inputs
Frame Synchronizer
- Supports TIROS weather frame format – HRPT, GAC, LAC, TIP, STIP, AIP, SAIP and AMSU
- 64-bit programmable frame synchronizer pattern
- Supports 10-bit and 8-bit word size
- Programmable frame size (max 64Kwords)
- CCSDS Reed-Solomon FEC quality status
- Automatic data polarity detection
- Supports Search, Check, Lock and Flywheel (SCLF) synchronization states

Bit Error Rate Tester (BERT)
- Built in pseudo-random noise (PRN) generator in each playback channel
- Built in PRN receiver in each record channel
- Programmable lock threshold
- Supports manual or automatic BERT receiver re-synchronization function
- Supports manual injection of bit errors to the PRN data
- Supports automatic error generation – PRN generator automatically injects errors to simulate the desired Bit Error Rate (BER)

Benefits
- Simultaneous record and playback channels.
- Supports multiple input and multiple output (MIMO) channels.
- Number of channels can be easily expandable by adding more Input and Output cards.
- High aggregate throughput rate (>> 1GBps).
- Reverse file playback function – playbacks from the end to the beginning of file.
- Independent data quality monitoring for each playback and record functions.
- Compliant with NOAA IT Security requirements, NIST SP 800-53, Rev 4. – guaranteed to pass Tenable Nessus security scan.
- Hot swappable RAID5/6/10 Data storage – protects against data loss.
- No kernel driver required for hardware cards. – system guaranteed to work after routine Operating System's security upgrade and kernel patching.

STDR System Specifications

<table>
<thead>
<tr>
<th>System ChassisCodes</th>
<th>3U 19” rack-mount chassis with dual redundant 600W power supplies</th>
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</thead>
<tbody>
<tr>
<td>Motherboard CPU/Memory</td>
<td>Intel Xeon® processors with 8 GB DDR3 RAM</td>
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<tr>
<td>Network Ports</td>
<td>Quad 4-Gigabit Ethernet Ports. One port will be used for external network interface. Up to 3 ports can be used for local network connections to the STPFS FPGA card</td>
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<tr>
<td>Storage</td>
<td>Adaptec RAID 6805E Controller: Up to eight (8) 6 Gb/s SATA/SAS disks, Two (2) 250GB Solid State Drive (SSD) in RAID1 configuration for OS, Six (6) 2TB 7200RPM 6Gbps SATA Hard Drives configured with RAID5 for a total of 10TB data storage capacity</td>
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<tr>
<td>Serial Data Input-Output Ports</td>
<td>Six (6) 40Mbps TTL Output Ports, Six (6) 40Mbps RS422 Output Ports, Three (3) 800Mb/s ECL Output Ports, Six (6) 40Mbps TTL Input Ports, Six (6) 40Mbps RS422 Input Ports, Three (3) 800Mb/s ECL Input Ports</td>
</tr>
<tr>
<td>Timing Ports</td>
<td>IRIG-B and 1-PPS</td>
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<tr>
<td>Front Panel LEDs</td>
<td>Six (6) Activity LEDs, one for each channel</td>
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<tr>
<td>Remote Monitor and Control Port</td>
<td>One (1) DB9 RS232 Serial Communication Port for LEO-T interface</td>
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<tr>
<td>OS</td>
<td>Red-Hat Enterprise Linux (RHEL) 6.5 or latest</td>
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<tr>
<td>Digital Recorder Hardware</td>
<td>One (1) STPFS FPGA data processing board, Three (3) Channel Input-Output (I/O) FPGA boards. Each I/O boards contain two independent record/playback channels for total 6 channels</td>
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