

Enhance visibility into data quality, integrity, and network performance from receiver output to the network edge

The LinksCheck Product Suite

SRI's LinksCheck suite of instruments and network health and status management products that help confirm telemetry acquisition chain readiness—from receiver input to the data center and beyond. DQQL for real-time data quality awareness, HexaBERT for BER and stream integrity, and NetCheck for throughput, latency, and IRIG 218-20 packet delivery. Find problems before mission data is at risk.

DQQL	Real-time Data Quality Quick Look—operator signal quality awareness for six simultaneous IRIG 218-20 telemetry streams
HexaBERT-IP	Six-channel IRIG 218-20 TMoIP BERT system—PRN-based BER estimation and TMoIP packet analysis
HexaBERT-TTL	Six-channel TTL BER/DQM analyzer—bit-level PRN verification with a TTL Clock and Data interface
NetCheck	Ethernet traffic generator, analyzer, and network impairment emulator for IRIG 218-20 LAN/WAN infrastructure validation

Shared Platform Features

Hardware	Software & Networking
2U 19-inch rackmount chassis with configurable display - One 1Gb Ethernet interface for remote access and monitoring - One 1Gb Ethernet interface for IRIG 218-20 data stream	- Browser-based operator interface—no client software required - Stored configuration profiles for quick repeatable test sequences - Optional exportable results and reports in standard formats

Common to All LinksCheck Instruments

- Receiver-agnostic
- Multi-channel simultaneous operation—up to six streams
- Designed and tested for flight test and launch ranges
- Real-time graphical displays
- Compatible with SRI's RM-6322 Telemetry Signal Simulator for end-to-end telemetry test and validation.
- Logging across all channels (Optional)

Where LinksCheck Instruments Fit

DQQL can be deployed wherever link performance awareness is needed—ground stations, data centers, mobile assets—providing operators with immediate visibility into telemetry data quality and link status for Data Quality Metric (DQM)-encoded data streams.

HexaBERT-IP is the engineers' tool for validating TMoIP stream integrity, performance, and estimated PRN BER within packet payloads.

HexaBERT-TTL verifies the telemetry bitstream at the TTL Clock and Data interfaces, whether DQE-encoded or not.

NetCheck validates the Ethernet infrastructure—verifying throughput, latency, packet delivery, and network readiness before the mission.

Capability Comparison

✓ Included ○ Option — N/A

Feature / Capability	DQQL	HexaBERT-IP	HexaBERT-TTL	NetCheck
Real-time DQM/DQE extraction and display	✓	○	○	—
Six-channel simultaneous operation	✓	✓	✓	✓
Bit Error Rate (BER) measurement	○	✓	✓	—
IRIG 218-20 packet support	✓	✓	—	✓
TTL clock & data interfaces	○	—	✓	—
PN pattern generation & error insertion	—	—	—	✓
Packet loss / Out-of-Order detection	○	✓	—	✓
Latency & jitter measurement	—	✓	—	✓
Traffic impairment emulation	—	—	—	✓
Far-end Loopback	—	—	—	✓
RFC 2544 Testing: Throughput, Latency, Frame Loss	—	—	—	✓
Logging	○	○	○	✓
DQE De-capsulation and re-broadcast	○	○	—	—
Operator dashboard and strip chart displays	✓	✓	✓	✓



DQQL – Data Quality Quick Look

Real-time DQM Dashboard

Summation Research, Inc.
Flight Test Range Instrumentation

Real-time telemetry data quality awareness—up to six simultaneous IRIG 218-20 streams.

Overview

DQQL provides telemetry operators and engineers with immediate visibility into data quality, synchronization status, and link health—without post-processing or specialized analysis tools. The system monitors up to six IRIG 218-20 TMoIP streams, extracting and displaying DQM values alongside real-time BEP trends.

Strip-chart displays of BEP trends can help identify and track signals using Receiver DQM information *prior* to Receiver bit-sync acquisition.

Optional DQE de-framing and re-broadcast allows support of legacy telemetry instruments & software tools that do not support DQM/DQE.

Applications

- Situational awareness of range telemetry links
- Real-time telemetry quality monitoring during missions
- Pre-mission checkout and verification
- DQM monitoring and cross-stream comparison
- BEP trend monitoring using real-time strip chart displays
- Rapid troubleshooting and fault isolation
- Ease the transition to expanded TMoIP range infrastructure
- Suitable for fixed and mobile receive stations, data processing centers, and telemetry laboratories.
- Optional metrics logging for review and analysis

RM-7112 Data Quality Quick Look (DQQL) Indicators, Measurements, and Controls

Indicators	Measurements	Controls
DQE Framed	Data Quality Metric (as BEP)	IP Address (DQQL)
Data Active	Payload Length	Host IP Address (per channel)
Data Sync	DQE Packet Count	Host IP Port (per channel)
Sync Loss (latching indicator)	DQE Packet Error Count	Gap (treatment of missing packets)

OPTION—Integrated BERT Functions

Adds PRN-based BER test and receiver characterization to the DQQL platform, enabling one chassis for both operational monitoring and precision engineering test.

OPTION—Logging

Select one or more input data streams for logging at a configurable rate. Log entries include timestamp, stream identifier, average BEP, optional average BER, DQM status, synchronization status, and alarm events recorded during the measurement interval.

OPTION—DQE De-Encapsulation and Re-broadcast

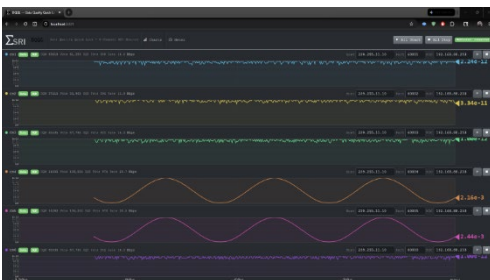
Select one input Data Quality Encapsulated (DQE) stream for de-framing and re-broadcast as a non-DQE payload stream. Supports monitoring, analysis, or recording of telemetry data streams by non-DQE instruments or software tools.

Operational Benefits

- Faster detection of degraded telemetry conditions
- Reduced troubleshooting and checkout time
- Simplified data quality assessment
- Single display replaces multiple monitoring tools
- Supports proactive maintenance through simplified testing and recording

Physical & Interface

- 2U 19-inch rackmount chassis with configurable display
- One 1Gb Ethernet for IRIG 218-20 port
- One 1Gb Ethernet remote access and monitoring port
- Browser-based operator interface—no client software
- Range room, mobile, and laboratory deployment
- Optional NTP time synchronization for time-tagged logging



Precision six-channel telemetry stream validation, BER estimation, and transport analysis with a simple, browser GUI

Overview

HexaBERT provides Bit Error Rate (BER) estimation across up to six telemetry data streams with either IRIG-218-20 TMoIP (**HexaBERT-IP**) or TTL PCM (**HexaBERT-TTL**) instrument interfaces. HexaBERT-IP ingests multicast or unicast IRIG 218-20 TMoIP streams and analyzes the integrity of packet transport and the telemetry payload quality.

Applications

- Six (6) channels BER estimation
- Dynamic indicators and strip chart views for trending visibility
- TMoIP stream analysis and validation (-218)
- DQM/DQE visibility and assessment (Optional)
- Metrics logging (Optional)

RM-7132 [IP] / RM-7142 [TTL] HexaBERT Indicators, Measurements, and Controls

Indicators	Measurements	Controls
Clock/Data Active	Bit Error Rate / Probability	IP Address
BERT Sync	Bits Received	Host IP Address: Port (per channel)
Data Inversion (PRN, -TTL)	Errors Received	Gap (treatment of missing packets)
Sync Loss (latching indicator)	TMoIP Packets Received / Error (-218)	PRN Pattern

OPTION — DQQL Data Quality Display

Adds DQM visualization, enabling one chassis for both transport validation and operational monitoring.

Added Capabilities:

- BEP exponent display per stream
- Color-coded green / yellow / red quality meter view
- Configurable BEP vs. time strip charts

Added Benefits:

- Operator-facing dashboard alongside transport analysis
- Single chassis serves engineering and operations roles
- Consistent display format with standalone DQQL units

OPTION—Logging

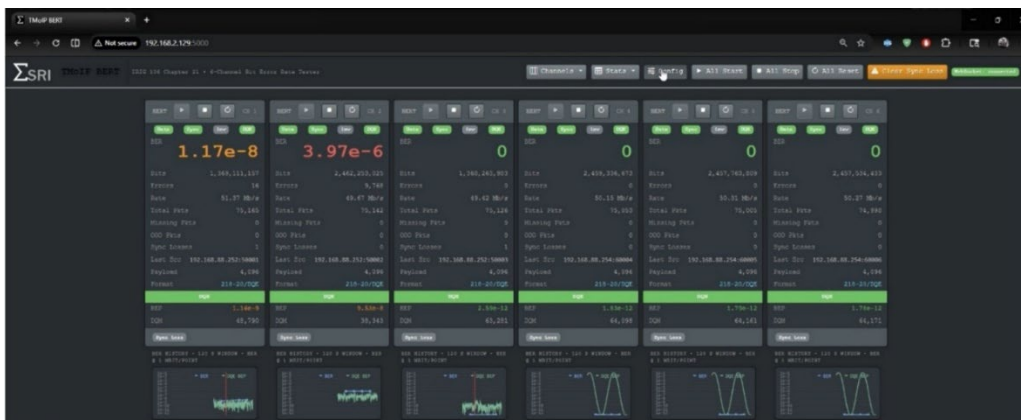
Select one or more input data streams for logging at a configurable rate. Log entries include timestamp, stream identifier, average BER, optional average BEP, DQM status, synchronization status, and alarm events recorded during the measurement interval.

Operational Benefits

- Rapid isolation of transport versus telemetry issues
- Reduced troubleshooting time—no PCM conversion required
- Improved visibility into packet behavior and telemetry quality
- Long-duration monitoring captures intermittent faults
- Reduces reliance on multiple standalone test instruments

Physical & Interface

- 2U 19-inch rackmount chassis with configurable display
- Six-channel architecture
- One IRIG 218-20 1Gb Ethernet input (-218) or Twelve TTL
- One 1Gb Ethernet remote access and monitoring port
- Web-based operator interface via HTTPS
- Optional NTP synchronization for time-tagged logging





NetCheck

TMoIP Traffic Generator, Analyzer & Impairment Emulator

Summation Research, Inc.
Flight Test Range Instrumentation

Multi-stream IRIG 218-20 Ethernet traffic generation, analysis, and network impairment emulation for range infrastructure validation.

Overview

NetCheck verifies that the Ethernet infrastructure carrying IRIG 218-20 TMoIP delivers data reliably under nominal and stressed conditions—using traffic that matches actual operational patterns, not generic test traffic.

RFC 2544 benchmarking, built for telemetry ranges. NetCheck runs all four tests — Throughput, Latency, Frame Loss, Back-to-Back — against IRIG 218-20 TMoIP traffic at selectable frame sizes (64 B–9000 B), confirming your network can support mission telemetry before operations begin.

NetCheck generates traffic at variable packet lengths and emulates real-world impairments — latency, packet loss, jitter, reordering, duplication, corruption — on internal or live traffic. Pair with a remote DQQL or HexaBERT for far-end signal validation.

Applications

- IRIG 218-20 Ethernet network infrastructure validation
- Pre-deployment network performance verification
- Multi-stream telemetry traffic load testing
- Network equipment evaluation and benchmarking
- Impairment emulation for system resiliency testing
- Live traffic impairment analysis in operational networks
- Range network troubleshooting and fault isolation

SRI's *Far-End Loopback* function reflects incoming data streams back to the source address, enabling enhanced troubleshooting and validation of the acquisition chain from a single location.

RM-7162 NetCheck Supported Impairments

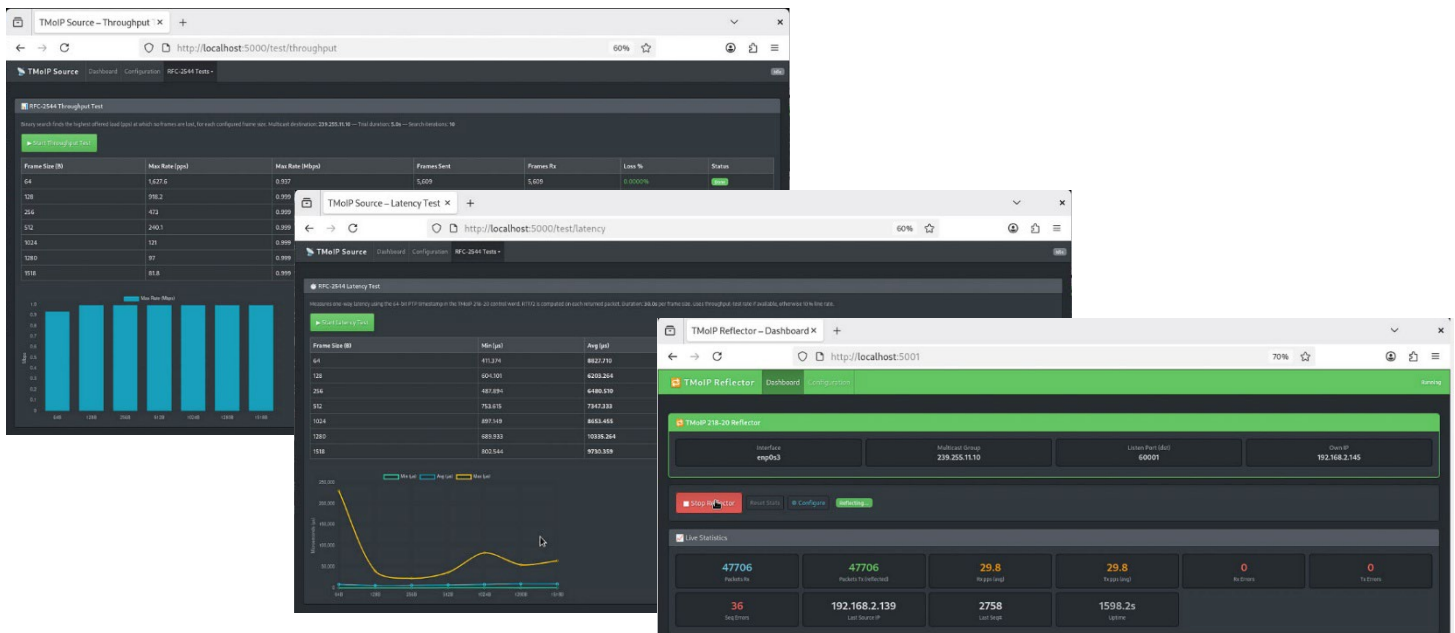
Bandwidth	10 Kbps – 1,000 Mbps
Latency / Delay	100 μ s – 4,000 ms (1G); 100 μ s – 2,000 ms (10G/2.5G); single, uniform, random
Packet Loss	0 – 50%
Reordering	0 – 50%; delay $\leq$ 8 sec
Duplication	0 – 50%; periodic or random
Congestion	Link utilization 0 – 50%; burst 64 – 1,000,000 bytes
Error Insertion	Message error insertion

Operational Benefits

- IRIG 218-20 formatted TMoIP packets for typical traffic patterns
- Combined generator, analyzer, and impairment emulator
- Validates network health before mission-critical data is at risk
- Analysis with live traffic—no need to take systems offline
- Impairment emulation helps identify the effects of network impairments on critical instrumentation and data analysis tools.

Physical & Interface

- 19-inch rackmount chassis
- 1 Gigabit Ethernet interfaces
- Browser-based interface—no client software
- System health monitoring: CPU, NIC errors, socket stats
- Suitable for range room, WAN lab, and mobile deployment



Range Telemetry Scenarios

LinksCheck instruments work independently or together to provide layered visibility across telemetry and network infrastructure.

Scenario 1—Pre-Mission Checkout: Identify Receiver, Transport, or Configuration issues

- HexaBERT-IP analyzes IRIG 218-20 TMOIP stream integrity and PRN BER at each ground station
- Use DQQL to confirm data synchronization, DQM status, and telemetry data quality across multiple streams
- Use an RM-6322 Telemetry Signal Simulator with HexaBERT-IP or -TTL to characterize receiver performance under varying Eb/No conditions
- Remotely log into a DQQL or HexaBERT at another location to verify far-end signal reception and performance

Scenario 2—Network Infrastructure Validation: Verify Network Readiness

- Use NetCheck to generate multi-stream IRIG 218-20 TMOIP traffic at operational loads
- Introduce controlled latency, packet loss, jitter, reordering, and congestion to characterize network behavior under degraded conditions.
- Engineers can verify that the infrastructure meets latency, throughput, and packet delivery performance across switches, routers, WAN links, and transport infrastructure
- Confirm network readiness before mission telemetry traffic is introduced.

Scenario 3—Live Mission Performance Monitoring: Rapid Fault Isolation

- Use DQQL strip-chart displays to identify and track weak signals using Receiver DQM information prior to bit-sync acquisition
- See signal degradation, receiver issues, acquisition chain anomalies, and transport impairments as they occur
- Use NetCheck network statistics and packet performance metrics to isolate transport-related issues
- Log telemetry quality and network performance metrics for post-mission review and root-cause analysis

Scenario 4—Range Sustainment and Trends: Enable Predictive Maintenance

- Continuously collect BER, DQM, synchronization, and network performance metrics over extended periods.
- Trend receiver performance, link margins, and transport health across weeks or months of operation
- Detect gradual degradation before it results in mission-impacting failures
- Support sustainment planning, equipment replacement decisions, and long-term range readiness.

Designed for Flight Test Environments

- IRIG 218-20 and TTL support for legacy devices
- DQM/DQE capable
- Multi-channel operation
- Local and Remote user access
- Compact, for rack-dense and mobile deployments
- Engineered by Summation Research



Summation Research, Inc. | **LinksCheck Product Line** | **Flight Test Range Instrumentation**
For specifications, quotes, and application support, contact your Summation Research representative.