Quasonix

MADE IN USA

Maximum Likelihood Stream Combiner (MLSC™)

"Best" Just Got Better

Introducing the Quasonix Maximum Likelihood Stream Combiner, a new approach to Best Source Selection that extracts optimal data from multiple received signals. Brought to you by the engineering team that developed the industry's premier Best Channel Selector, the MLSC™ leverages Data Quality Encapsulation (DQE), Maximum Likelihood Bit Detection (MLBD), and proprietary Quasonix algorithms to improve your received data accuracy under the most challenging conditions. Quasonix is... Reinventing Telemetry™.

Industry-Leading Implementation of the DQM/DQE Industry Standard — The MLSC faithfully implements MLBD, using the Data Quality Metric (DQM) for each bit of every bit stream to determine the most likely correct output bit. Not only does the MLSC derive the lowest achievable output bit error rate possible, it also constructs accurate DQM for the output stream, which can be used in cascaded MLSC™ arrangements or by other downstream equipment.

Superior Dynamic Acquisition and Tracking Performance — MLBD is only optimal if all received data streams are able to participate in the combining process at all times. This requires seamlessly maintaining stream alignment at the bit level, while tracking signals through the deep fades that are typical of serial streaming telemetry channels, and almost instantly reacquiring and realigning those streams that lose lock. The resulting system can easily track Doppler rate differentials due to the fastest of targets, well above Mach 25.

Affordable and Scalable — Twelve PCM I/O and twelve TMoIP I/O are independently configurable as input or output for MLSC groups, with up to twelve input channels and four channel groups (outputs) per unit. MLSC units can be cascaded to achieve any number of channels for larger systems and can be paralleled to support any number of channel groups.

Easy to Set Up and Use — Automatic DQE frame detection; local front panel interface with four displays for health and status monitoring, including presentation of DQM, time skew, and source-selection state; browser interface for health status monitoring, including integrated status reporting and logging such as input and output quality and quantifications of improvement.

The MLSC is supported by lifetime software updates and is easily field upgradeable.

Maximum Likelihood Stream Combiner Specifications

Core	
Data rate	24 Kbps (100 Kbps for TMoIP) to 46 Mbps per channel (TMoIP max aggregate rate of all channels limited depending on specific user settings)
Physical input/output channels	12 PCM and 12 TMoIP available
Logical input channels	4, 8, or 12 optionally available (Each logical input is assignable to one channel group)
Channel groups	4 available
Selection criteria	Signal quality via DQE; Majority Vote; Best Channel
Differential time skew	At least 1 second
Differential delay slew	Up to 1ms per second
BERT	Bit error rate test capability using pre-defined patterns on each output and input channel
EBERT	Estimated BER (BEP) based on DQM for data provides quality information for real data, including encrypted data; on each input and output channel
Minimum sync threshold	10% BER one channel, 5% BER all channels
Performance gain	Greater than 6 orders of magnitude in BER over the BER of the best single stream, given 8 streams with BERs between 10% and the best single stream. See page 4 for an example.
2-channel break frequency	Up to 10 kHz
Automatic DQE frame detection	Yes
Expansion	Cascaded MLSC via DQE
Expansion limit	Multiple MLSC's can be cascaded to support an effectively unlimited number of channels Multiple MLSC's can be paralleled to support an effectively unlimited number of channel groups

PCM I/O	
Channels	12, each independently configurable as output or input for MLSC channel groups
BNC clock and data pairs	12 (75 ohm, TTL)
MDM-25 ports	2 (RS-422)
Clock/Data polarity user selectable	Yes
Auto clock edge detection	Yes

TMOIP I/O

Channels	12, each can be an input or output for MLSC groups
Packet format	IRIG 218-20 TMoIP
First bit timestamping	Based on Network Time Protocol (NTP) or Precision Time Protocol (PTP) time, via Ethernet

Network

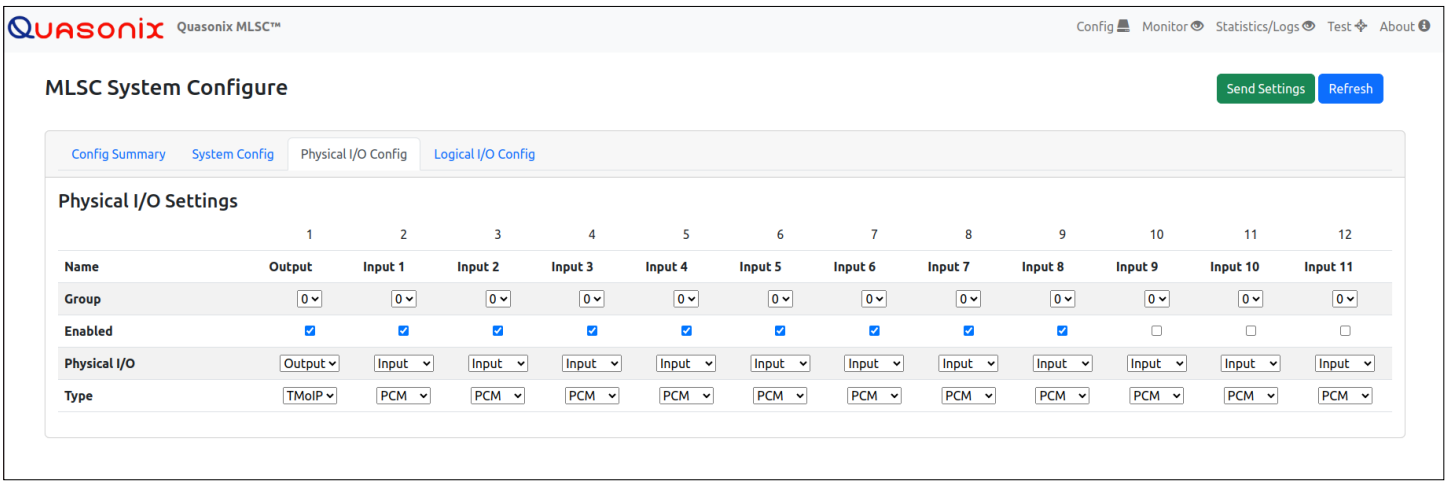
Network interface	1000 BASE-T
Number of interfaces	2, separate ports for configuration and TMoIP data

User Interfaces

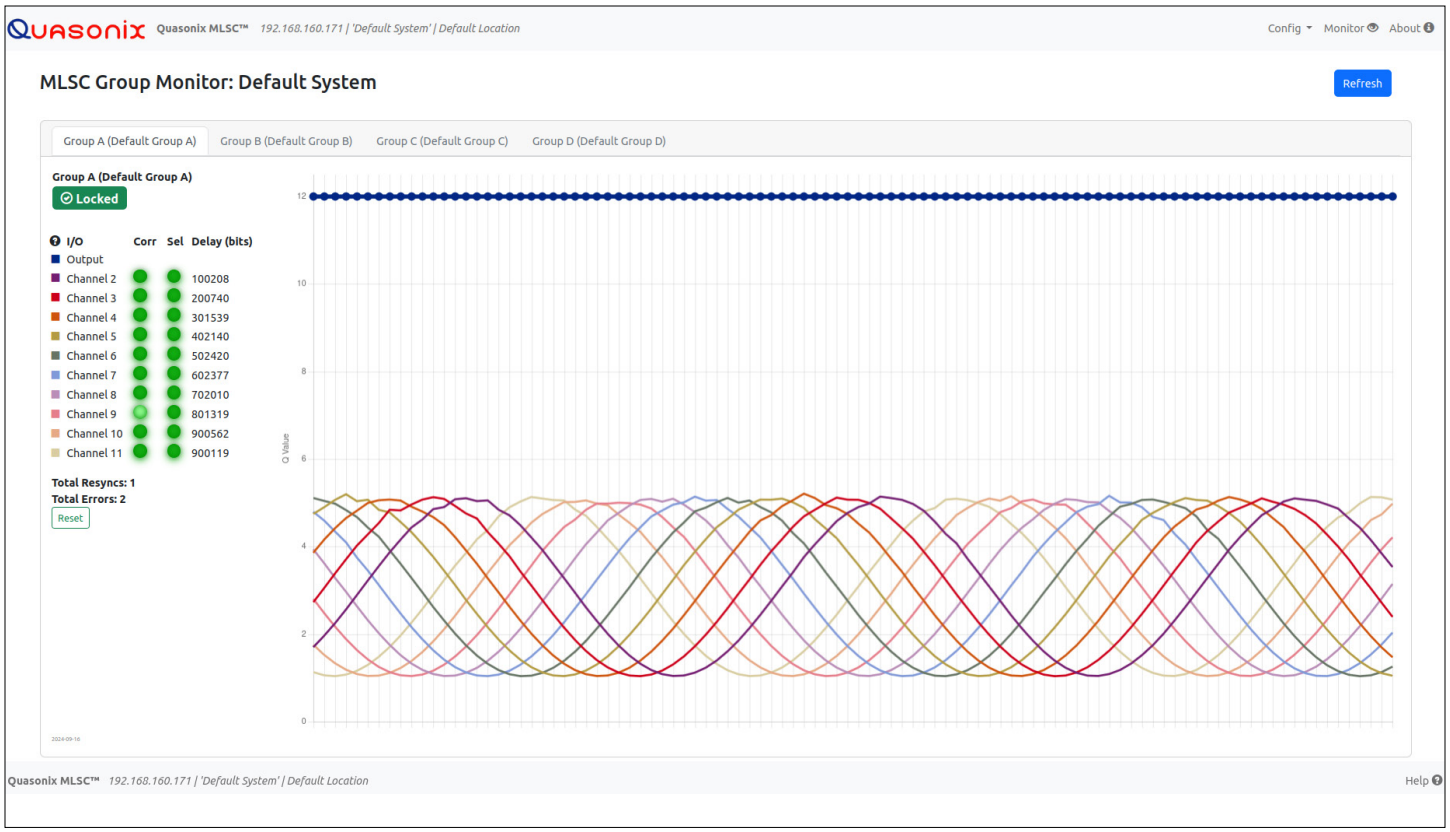
Local front panel interface	4 displays for health and status monitoring, including presentation of DQM, time skew, and BSS state
Browser interface	Command, control, health, status, and logging
Integrated status reporting, logging	Yes
Easy field updates	Yes

Physical

Size	1U rack-mount chassis: 18.95” wide, 1.75” tall, 13.83” rack depth, 15.02” overall length
Weight	7.4 lbs.
Power	90-264 V-RMS, 47-63 Hz



Sample browser interface Configuration page.



Sample browser interface Monitor page.
Note the 6+ orders of magnitude improvement in output relative to the **best single stream** at any given point in time.

Meet the Quasonix BSS Analyzer (BSSA™)

How do we know that the MLSC is a better BSS? While we're extremely confident of our theoretical approach, there's no substitute for empirical testing. The BSSA provided that, allowing rigorous analysis and honing of the MLSC throughout its development.

The BSSA is a unique tool to emulate real-world channel conditions across all received signals in a range, allowing precise, repeatable BSS testing. With the BSSA, you can evaluate the performance of different BSS units or settings, and you can compare results against theoretical best achievable performance. It's time to take the guesswork out of your mission-critical equipment. Learn more about the Quasonix BSSA at quasonix.com/bssa.pdf.

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