

LS-18-M SERIES PORTABLE MULTI-STREAM DATA AND RF TELEMETRY SIMULATION AND PROCESSING ENGINE

The latest telemetry equipment provides a powerful and flexible toolset for flight test engineers

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Building off of the proven success of LS-28-DRSM and LS-68-M Series Products, as previously featured in International Aerospace Testing 2017 Showcase Edition, pages 64-66; International Aerospace Testing 2019 Showcase Edition, pages 72-74, Lumistar has designed a new complimentary product known as the LS-18-M that enhances the new modular series product line offerings.

Lumistar has long been known as a premiere provider of telemetry simulation products, with three generations of legacy product offerings in multiple configurations such as PCI/PCIe/cPCI/ Portable and Rack Mount configurations. The new LS-18-M Series Multi-Stream Telemetry Simulation & Processing System is a highly advanced fourth generation product, offering features and flexibility previously not available in a single unit.

PRODUCT FEATURES AND FUNCTIONALITY

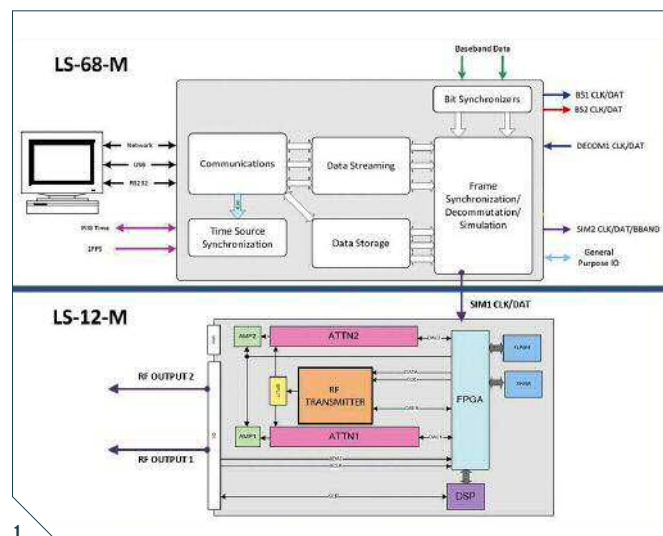
The LS-18-M Series of Telemetry Simulators is available in multiple physical configurations, including modular, portable and rack-mount. The combination of packaging provides for a system that is ideal for fixed ground, mobile, airborne and remote applications. The Simulator has been constructed using ruggedized components that will function in the

extremes of harsh environments as well as in benign ground station environments.

The LS-18-M Series Telemetry Simulators have excellent utility when it is required to perform a full telemetry receiving system check out, such as prior to a flight test. When the actual flight test article's telemetry signal is not available, a telemetry simulator allows ground station operators to insure their system is fully operational prior to the real test. The LS-18-M will allow the system operators to verify all functional areas of the ground system, including the RF front end, and data transport systems, and verify the real time displays are updating as expected. It has been noted that many Flight test Directors have noted that a pre-flight telemetry ground station checkout has been "worth its weight in gold", eliminating needless and costly delays of the real flight test.

PRODUCT FEATURES

The LS-18-M Series system provides one stream of simulated PCM clock and data up to 50MB/s. The simulated clock / data can be programmed using the Lumistar supplied LS18M application, which connects via Ethernet, USB, or RS-232. Various file formats will be able to be loaded and played back. This data stream can also be applied to the internal RF Transmitter, which can provide



modulation formats of PCM / FM (ARTM Tier 0), SOQPSK (ARTM Tier 1) and Multi-H CPM (ARTM Tier2) formats up to 45 Mbps (up to 20MB/s for PCM / FM). The RF Transmitter unit will also accept external PCM clock and data from a User's own data sources, thus it can be configured to operate as a simple Data Modulator. Single RF band versions are available, and can be ordered with dual, tri and up to five standard RF frequency bands, such as lower and upper L bands (1435-1535 MHz and 1750-1855 MHz), S band (2200-2400 MHz), NATO-E band (2185-2485 MHz) and C-band (4400-5250 MHz). Note: European



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C band is 5091-5250 MHz. The design provides for single RF output, or an option to split the RF signal in to two streams if desired. Each RF signal can be attenuated over a wide range, either statically or dynamically. Thus if a fixed RF level to 0.5dB resolution is required, this is achievable from approx. +5dBm and -80dBm. Using the dual stream RF output option, the user can program the RF outputs to vary dynamically. In this case, the LS-18-M can be used as a multipath simulation unit. The user would be able to provide many different “multipath fade” scenarios, and test his system response. In cases where the system response was not as desired during multipath, real time adjustments in receiver or bit sync parameters might provide improvements.

In order to provide standardized IRIG-106 Telemetry Frame Simulation, the unit will produce major and minor frame data in IRIG-106 Chapter 4 Class 1 and II formats. Variable Word Lengths of 3 to 16 bits, minor frame lengths of 3 to 65536

words and major frame lengths of 1 to 4096 minor frames is accommodated. Bit order can be adjusted as MSB or LSB, with leading or trailing frame sync locations. The system supports sub frame sync modes of FCC, FAC, SFID, URC. The unit supports up to six dynamic and 56 unique words, provides for programmable word and frame attributes.

For those wishing to use the unit for bit error rate analysis, the unit provides both simulated PRN generation and PRN bit error rate reading. Many patterns are available, such as 2^{11-1} , 2^{15-1} , 2^{17-1} and 2^{23-1} . If an analog PCM “video” data signal is required, the unit will also provide this capability and includes a software controlled baseband lowpass filtering bandwidth selection of 0.125, 0.25, 0.5, 1, 1.5, 2, 2.5, 3, 4, 6, 8, 10, 15, 20, 35MHz. The “video” signal output level is also software controlled. The simulator also provides a number of output code conversions, such as NRZL-L/M/S, BIO-L/M/S, RZ, DM-M/S, M2-M/S.

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“THE LS-18-M SERIES TELEMETRY SIMULATORS HAVE EXCELLENT UTILITY WHEN IT IS REQUIRED TO PERFORM A FULL TELEMETRY RECEIVING SYSTEM CHECK OUT”

Since the LS-18-M technology is based upon using core capabilities in the LS-68-M Series products (coupled with a newly redesigned “LS-12”), Lumistar can also offer ancillary functions such as one full featured bit synchronizer and decom, with 50 Mbps data rate capabilities. If the bit sync / decom option in the LS-18 Series is selected, the unit then also provides PCM TTL clock data bit sync outputs and a Gigabit Ethernet UDP Multicast data