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RF WAVEFORM RECORDING AND REPRODUCING

A two/four channel system capable of recording and reproducing up to 200MHz of RF spectrum from 200MHz to 6GHz is now available

// MARK MCWHORTER

This is a breakthrough product from Lumistar. The company first began offering bit data recording capabilities in 2017 with the introduction of the LS-28/68 Series Products. The LS-29-R2 expands this to include the ability to record and playback any RF waveform, and optionally simultaneously demodulate / ethernet broadcast the data modulated on the waveform.

The standard LS-29-R2 Series is housed in a 2u rack mount configuration. The system is available as a 2-channel configuration or as a 4-channel configuration. In the latter, each pair of two-channel functionality is completely redundant from the other two.

The system is designed to capture RF waveforms up to 50MHz bandwidth per channel. Thus, the system will capture up to 200MHz aggregate bandwidth in a four-channel system. This can capture and reproduce any IRIG-106 aeronautical telemetry data stream. The design also allows for recording at bandwidths lower than 50MHz, and the total record time capacity is inversely proportional to the channel bandwidth recorded. This can greatly increase the recoding time at lower data rates / bandwidths versus higher data rates / bandwidths.

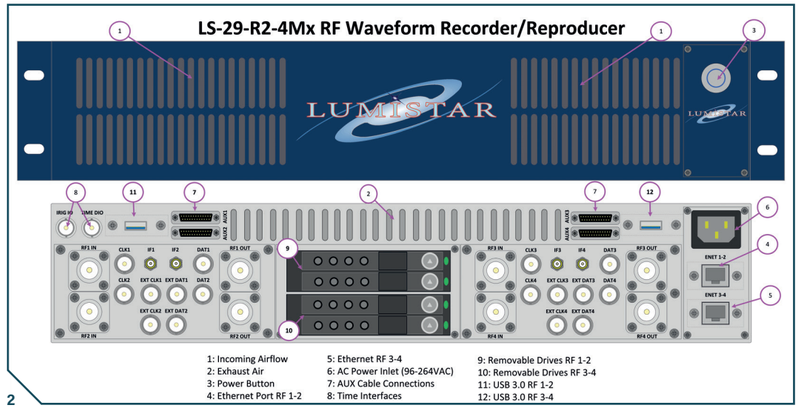
The RF input frequencies available to the user include 200MHz up to 6GHz, in any 50MHz bandwidth. The system will also accept and record the standard 70MHz IF Output from any traditional receiver. The system can be configured to accept any standard RF band, such as S band only (2200-2400MHz), up to five standard RF bands, plus the IF at 70MHz. Typical standard bands are lower L band (1435-1540MHz), Upper L band (1710-1850MHz), C band (4400-940Mhz and 5091-5250MHz). Any custom bandwidth between 200 MHz and 6 GHz can be accommodated. The system can reproduce the recorded RF waveform at any desired frequency... at the same or other than the one it was recorded at. Utilizing the Lumistar LS-27-M Series Rf Front End, the system can capture over 100dB of Dynamic Range.

1 // The LS-29-R2 is a breakthrough product from Lumistar, which first began offering bit data recording capabilities in 2017

2 // Front and back panels of the LS-29-R2 unit

Signal I/O is provided on the rear panel of the 2u chassis (see figure 2). The four-channel system offers two redundant two-channel systems in the same enclosure.

RF Input (for Recording) and RF Output (Passthrough copy in Recording mode or Playback of the recorded waveform in Playback mode) are Type-N Female. All units provide an IF Output via SMA-F connector, and this signal is available during recording and playback.



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Optional systems that offer demodulation provide BNC-F connectors for the TTL Clock/Data and Multi-Pin Connectors are supplied for the RS-422 High Speed Differential. Demodulation of the real time recording and post-mission playback is also supported over the appropriate port on the RJ-45 Giga-Bit Ethernet connection in various formats (Chapter 4 & 10, plus IRIG-18). Time stamping from 1 PPS is via BNC-F. As a bonus and a standard feature, the system can deliver the traditional auto-tracking receiver function by using the integral programmable AM/AGC signal outputs.

All control and status are accomplished via TCP/IP over the Gigabit Ethernet.

A standard removable solid-state drive of 8TB per two channels is provided. This provides a minimum aggregate recording time of 312 minutes for maximum bandwidth allocation. Lower bandwidths provide a scalable increase in recording time. For example, if only recording a 10 MHz bandwidth the user can record each channel for up to 2,952 minutes.

The removable solid-state drives facilitate quick file transfer. Data can also be downloaded via LAN. Larger drive sizes can be accomodated on special request.

Both two and four-channel systems provide the option to provide data demodulation in the Recording and Playback mode. Optionally, the system will provide demodulated TTL and RS-422 PCM clock/data, optional bit data recording, as well as optional packet data broadcasted via UDP Giga-Bit Ethernet. Available demodulation modes are many: PCM/FM, SOQPSK, Multi-H CPM, GMSK, BPSK, QPSK, AQPSK, AUQPSK, UQPSK and PCM/PM. Error correction codes such as LDPC, Viterbi and Reed-Solomon are supported.

The system size is 19in (48cm) wide by 3.5in (9cm) tall, and 22in (56cm) deep in a standardized 2U E.I.A. Rack Mounting configuration. The weight of the four-channel system is approximately 25 lbs (11.4 kg). The system is available in both "forward-mount" and "rear-mount" configurations. The LS-29-R2 operates from any universal power supply (100-240 VAC, 47-63Hz), at approximately 160 watts for the four-channel version. A smaller modular ruggedized version of the LS-29-R2 is in development. \\

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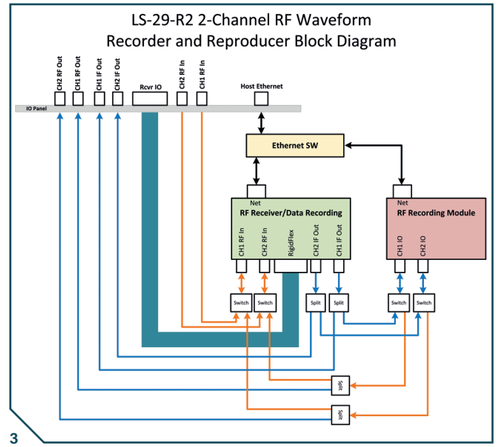

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3 // Block diagram of the LS-29-R2 system