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LS-28-TRS Advanced Technology Quad Receiver/Combiner Unit Data Sheet

The Lumistar LS-28-TRS 4U Rack Mount Quad Receiver/Combiner, shown with optional external 1U Keyboard/Display, offers a low-cost high-performance COTS solution for a modern Telemetry Ground Station Receiving System.

The LS-28-TRS is an advanced technology “Quad” Receiver/Combiner employing sophisticated fourth generation Digital Signal Processing (DSP) technologies. The LS-28-TRS supports four channel reception and/or combining of S-band, Lower L-band, and Upper L-band RF signals. The RF inputs are processed by two Lumistar dual channel PCI-based tuner cards that acquire and downconvert the signals to a 70 MHz intermediate frequency (IF). These IF signals are then digitized and combined in one of two Lumistar optimal digital pre-detection combiners prior to demodulation, or routed directly to one of four ARTM demodulators for single channel operation. The digital demodulation module performs subsequent processing functions including multi-mode demodulation (ARTM Tier 0, I, II), bit synchronization, and code conversion, along with eye pattern and constellation diagram data. Legacy demodulation of NTSC FM signals is also included. The resulting PCM data is not routed through the PCI system bus, thus the LS-28-TRS can process multiple high data rate streams with minimal impact to the processing load of the CPU.



Unlike analog legacy Receivers, the LS-28-TRS is a true software-defined radio whose architecture and digital implementation are highly flexible and expandable. The LS-28-TRS provides single/dual/tri band operation utilizing two Lumistar LS-27 “Dual Channel - Tri-Band” down converters that occupy one PCI slot each. The receiver processes data rates from 30 kbps to 22 Mbps for Tier 0, 1 – 44 Mbps for Tier I; and 5 – 44 Mbps for Tier II. The LS-28-TRS sensitivity at lower data rates is superior due to the analog IF “SAW” and digital “FIR” filtering method employed to the IF signal. By using this method, IF bandwidths as narrow as 50 kHz are easily achieved. This filtering also ensures excellent adjacent channel interference performance. The Digital Combiner is an Optimal Ratio Pre-Detection diversity combiner uses AGC & AM weighting to provide a signal to noise improvement of at least 2.5 dB with equal signals into the LS-28-TRS and operates at break frequencies to 50 KHz. Best source selection can also be done via software.

The performance of the LS-28-TRS is repeatable, day-after-day, year-after-year, from unit-to-unit. It requires no calibration and does not suffer the vagaries caused by changes in temperature or the passage of time. Life cycle costs are greatly reduced because future features, such as a new ARTM demodulation technique (for example COFDM), or an improved DSP algorithm are all implemented via software and/or firmware via an on-site upgrade. No hardware modifications are required.

The chassis contains a 14 PCI slot passive back plane and a single board computer with 1 GB memory and Pentium PIV Processor. The computer also has rear connections for the TCP/IP, monitor and keyboard/mouse interfaces. The LS-28-TRS runs Windows XP.

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Specifications are subject to change. Please verify the latest specifications at time of order.

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SPECIFICATIONS:

Down-Converter Section (4 Each):

Input Frequency	S-Band:	2185-2485 MHz
	Upper L-Band:	1710-1850 MHz
	Lower L-Band:	1435-1540 MHz
Tuner Resolution	50 KHz	
Frequency Accuracy	0.002%	
Noise Figure	8 dB (Maximum); 6 dB (Typical)	
Phase Noise :	Exceeds requirements for ARTM Tier II phase noise	
AM	2V p-p for 50% modulation depth	
AGC	Linear with 20dB/V with 0 V as signal threshold	
IF Filters:	20 (SAW and FIR filter technology)	
Adj Channel Interference:	exceeds IRIG requirements	

Pre-D Combiner Section (2 Each):

Combiner Type:	AM and AGC weighted
S/N Improvement:	2.5 dB typical (equal RF input levels)
Break Frequency:	50 KHz minimum for 20 dB fades

Demodulator Outputs (Four Each)

Demodulation Types	ARTM Tier 0, 1, 2 Analog FM for NTSC Video
Data Rates	30 kbps – 22 Mbps for ARTM Tier 0 1 – 44 Mbps for ARTM Tier I 5 – 44 Mbps for ARTM Tier II
Post Detection Filters	Up to 12, Software Selectable filters
Bit Syncs:	Four, Independent Data/Clock outputs
Code Conversion:	NRZ-L,M,S and Bi- Φ L,M,S; DM-M,S; MDM-M,S

Environmental:

Operating Temperature	0° to +50° C
Non-Operating Temperature	-25° to +70° C
Operating Humidity	0 to 90% (Non-condensing)
Non-Operating Humidity	Protect from moisture and contamination

Physical:

Size	19" W x 24" D x 7" H
Weight	55 Lbs (25 Kg) typical
Power Supply	115 V/230 V Auto-sensing – 300W