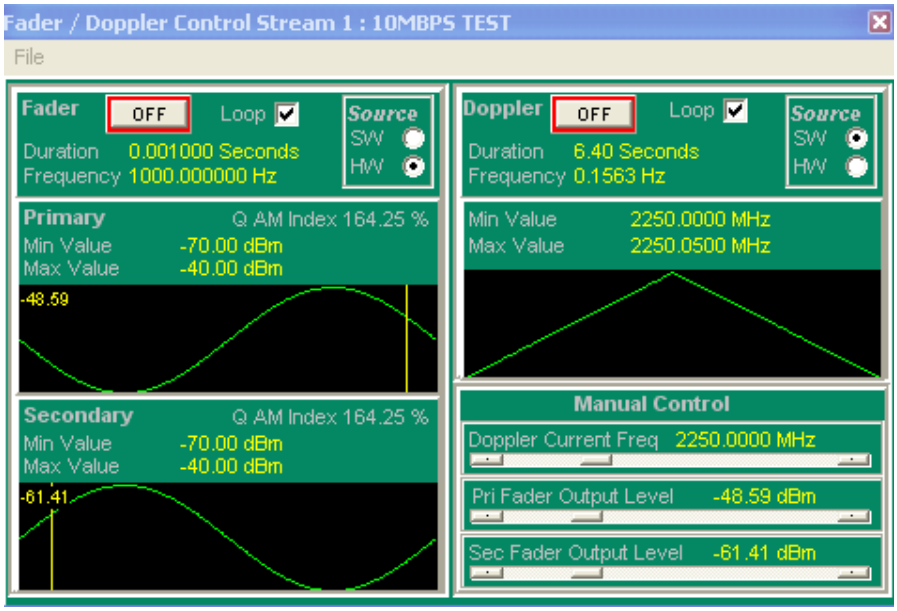
LUMISTAR

LS-18-AP-M(X)2 Multi-Path Telemetry Simulator
Data Sheet

Description:

The LS-18 Multi-Path Telemetry Simulator outputs two channels of correlated RF signals and allows the user to change output level and frequency to create the deep fades and rapid attenuation seen in flight test signals. The Multi-path Telemetry Simulator uses an LS-70-S PCI card to generate a custom dynamic PCM format that can be changed in real time as well as PRN patterns (with errors) and also allows the playback of archived telemetry again allowing the PCM data stream to be changed in real time

The LS-18 has an FM, SOQPSK, Multi-h CPM transmitter that allow for rapid changes in frequency that is split and feeds two Gallium Arsenide FET attenuators for rapid change in signal level to create two output streams. Attenuation fade rates of .01 Hz up to 35 kHz can be made with fades of up to 90 dB. The attenuation can be shaped as a Sine, Triangle, Square, Ramp and Step function to create the unique environments seen on ranges. The unit can also be used to test and evaluate range receivers.



1000 Hz Sine and Inv Sine with 30 dB fade and 50 kHz Doppler

Key Features:

- **Portable Rugged Computer with Pelican Case for transportation.**
- **Simulator & ARTM Digital Transmitter in a 4U Chassis**
- **ARTM Tier 0 (PCM/FM), ARTM Tier 1 (SOQPSK), or ARTM Tier II (Multi-h CPM)**
- **Available Bands (X) are S-2200-2400; L-1435-1540; U-1710-1850**
- **Programmable for PCM format, , transmitter frequency, and output power**
- **Dual Ported memory with 128K of 32-bit words**
- **Major Frame Lengths to 65,535 words per minor frame**
- **Simulator allows common, unique and 64 waveform words**
- **Each word may be changed dynamically while data is flowing**
- **Allows playback and re-transmission of archived files with dynamic changing of words**
- **Simulator contains pseudo-random generator that allows BERT with LS-50-P or RTR**
- **Programmable output level through software**
- **Can be used to create secure data link with external encryption device**
- **Archived information can be played back; reconstructed PCM data can be transmitted**

Lumistar, Inc. **3186 Lionshead Ave Ste 100** **Carlsbad, CA 92010**

PHONE: 760-431-2181 **FAX: 760-431-2665** **EMAIL: sales@lumistar.net** **www.lumi-star.com**

5/6/2020

DYNAMIC PCM SIMULATOR:

Number of channels	1
Modes	Independent or Slaved
Outputs	NRZ-L PCM Data, Code Selectable PCM Data, 0 degree clock, Minor frame strobes
Output Levels	Single Ended - TTL, or RS-422 on PCM Data and Clock outputs
Base-band Output	400 mV to 8 V p-p adjustable
Base-band Pre-mod Filter	8 selectable; 5 pole Butterworth
Differential Outputs	Capable of driving RS-422 or TTL compatible inputs
Output Data Rates	64 bps to 30 Mbps (NRZ), 64 bps to 15 Mbps (others)
PCM Codes	NRZ-L/M/S; Bi-Phase-L/M/S, DM-M/S, M^2, RNRZ-L-11/15, k=7 Convolutional Encoding Rate 1/2, 1/3
Word Length	3 to 16 bits programmable on a word-by-word basis
CRC Generation	CRC16/CCITT
Major Frame Length	Up to 65,535 words per major frame
Major Frame Depth	Up to 1024 Minor Frames per Major Frame
Bit Order	MSB or LSB first, word by word
Frame Sync Pattern	Fully programmable
Major Frame Sync	Fully programmable
Common Words	Data may be changed (word-by-word) while operating
Waveform Words	64 (including SFID, FCC) May be programmed to appear in every frame at the same location Data may be changed while operating.
Baseband Output Level	+/- 2 Volts p-p open circuit +/- 1 Volt p-p into 75 Ohms

IRIG A/B/G READER/GENERATOR:

Time Reader Input Format	IRIG A, B, or G
Time Reader Rate	½, 1, or 2 times normal rate
Input signal level	1V p-p nominal
Latency	2µsec (maximum)
Data Outputs	Automatic time tags for PCM data blocks (time accessible in register space)
Time Generator Output	IRIG A, B, or G
Time Generator Rate	½, 1, or 2 times normal rate

PSEUDO-RANDOM GENERATOR

Pseudo-random patterns	11, 15, 17, 19, 21, 23, and 25 bit
Forced Error Modes	Continuous Forced Error Single Forced Error
Fixed Patterns	1 in 2, 1 in 4, 1 in 8, 1 in 16, 2 in 4, 4 in 8, 8 in 16

RF TRANSMITTER:

Bands	Lower-L (1435-1535 MHz) Upper-L (1750-1855 MHz) S-Band (2200-2395 MHz)
	Others – consult factory
Modulations	IRIG Tier 0 (PCM/FM) IRIG Tier I (SOQPSK) IRIG Tier II (ARTM CPM Others – consult factory

RF ATTENUATOR:

Number of channels	1 or 2
Range	-10 to -90 dBm
Modes	Function & AM Modulation Depth
Functions	Sine, Cosine, Tan, Square, Triangle Ramp, all with inversion
Fade Rate (Hz)	.01- 100 SW; 100 – 35,000 HW
Number of Steps:	Up to 10,000

DOPPLER SHIFTER:

Range	Full Frequency Band
Functions	Sine, Cosine, Tan, Square, Triangle Ramp, all with inversion
Doppler Rate (Hz)	.01- 100 SW; 100 – 35,000 HW
Number of Steps:	Up to 10,000

MECHANICAL:

17” x 14” x 9” 44 LBS

Duo-Core
Processor
200 GB HD
Removable
2GB memory
CD-DVD-RW
USB
Window XP

MODEL NUMBERS:

LS-18-AP-AXXX#P

A= Modulation - F = FM; M = Multi-mode: FM, SOQPSK, and CPM
XXX = Frequency Bands; Up to three allowed
L=1435-1540
U=1710-1850
S=2200-2400
# = Number of outputs: 1 = single; 2 = dual
P = Optional Relative Phase Control

Examples:

LS-18-AP-FS2 is an S-band simulator with two outputs and FM modulation.
LS-18-AP-MLUS1 is a Tri-Band simulator with one output and FM, SOQPSK, and Multi-h CPM modulations (Tier 0, I, II)