LUMISTAR

LS-11-M3 Portable FM Test Transmitter

Data Sheet

Description:

The LS-11-M3 portable FM test transmitter is designed for checkout and troubleshooting of telemetry and digital communication systems operating with many different modulation options. Complete ground stations including the antenna with LNA, RF down-converter, IF receiver, bit synchronizer, and PCM decommutator can be tested using "live simulated" frame telemetry and end-to-end bit error rate checks can be performed. The design allows secure links to be tested with an external CFE encryptor. The LS-11-M3 is a sophisticated, portable, battery powered, multi-mode test transmitter with an on-board PCM data source. The on-board PCM source is capable of providing IRIG PCM frame formats as well and PRN patterns, with and without injected errors. The unit is also capable of accepting external clock and data sources for test modulation, by-passing the on-board PCM generation source.

The system can be configured manually via Touch-Screen, and also includes a software application which allows the user to configure PCM simulation frames, RF center frequencies and other configuration data and then download the setups to the unit for use in a stand-alone mode. The unit is delivered in a portable "Zero-IF" case with a latching cover and contains a LiFePO4 Battery (Lithium Iron Phosphate), which provides higher energy density at ¼ the weight of legacy lead-acid batteries). The battery supports which will supports up to 8 hours of continuous operation per charge. The LS-11-M3 contains an internal hot swappable AC supply with intelligent battery charger that recharges the internal power source.

Operational parameters include the PCM format parameter database information (frame sync patterns, wavewords, etc…), transmitter carrier frequency, and output power level. Transmitter deviation in FM is automatically controlled (0.35 peak in accordance with IRIG-106)). Output power can be selected from approx. -70 to +5 dBm in 5 dB steps. The Test Transmitter contains a LiFePO4 Battery (Lithium Iron Phosphate), which provides higher energy density at ¼ the weight of legacy lead-acid batteries. The unit also provides an internal battery charger and will operate for up to twelve hours on battery power having received on a full charge.

Key Features:

- **Small lightweight Multi-mode test transmitter with internal simulator**
- **Used for checkout and/or troubleshooting of complete RF data links**
- **Fully Programmable through USB interface**
- **Touch Screen Display for Control and Status**
- **Up to four internally stored configurations available for quick recall**
- **PCM simulator allows for common, unique, and waveform words**
- **Pseudo-random data generator for BERT mode and allows for adding forced errors**
- **Up to five RF bands available in a single unit**

LS-11-M Simulator with Multi-Mode Modulator
Data Sheet

Specifications	
Temperature (Operating)	-20 to 50 ^{o}C
Temperature (Non-Operating)	-40 to +70 ^{o}C
Weight	Under 10 pounds (4.5 kg)
Size	6” (L) x 9” (W) x 7.5” (H), Aluminum enclosure w/ latched cover
Host Interface	USB
Input Power (Switchable)	90-240 VAC 50-60Hz, 12 watts typical, mode dependent
Battery/Charger:	LiFePO4 (Lithium Iron Phosphate), internal charger
Transmitter Output Connector	Type N-Female
PCM Simulator Specifications	
PCM Format Selection	Four PCM format definitions in non-volatile memory
Front Panel Outputs (BNC x6)	SIM Clock Out, SIM Data Out, EXT Clock In, EXT Data In, Minor Frame Strobe, SIM Baseband Out
Output Levels	Single-ended TTL
Output Data Rate (transmitter) Output Data Rate (simulator)	150 Kbps to 25 Mbps (NRZ codes) 10 bps to 25 Mbps (NRZ codes)
PCM Codes	NRZ-L/M/S; Bi-Phase□-L/M/S; DM-M/S; M2, RNRZ-L11-29
Common Word Length	Variable from 3 to 16 bits per word on a word-by-word basis
Viterbi (optional)	k=7 Convolutional Rate 1/2, 1/3
CRC Generator	CRC16/CCITT Forward/Reverse
Minor Frame Length	2 to 8,192 words per minor frame
Major Frame Length	1 to 1024 minor frames per major frame
Bit Order	MSB or LSB-first
Frame Sync Pattern	7 to 32 bits, Leads or Trails
Sub-frame Modes	FCC, SFID, NONE
Common Words	May be a single value or selected from a group of one minor frame
Unique Words	Seven may be programmed in any mainframe, super-commutated, or sub commutated channel
Waveform Words	Five may be programmed to appear in every frame at the same location
Pseudo-random Generator	2^{11} or 2^{15} PRN bit pattern, plus one Forced Error per Pattern
PCM Transmitter Specifications	
RF Bands, up to 5 available in a single unit (500 MHz to 5250 MHz)	Examples: S-Band (2200-2400MHz.): Model LS-11-M3S L-Band (1435-1540 MHz): Model LS-11-M3L
Tuning Resolution	0.5 MHz standard
Modulation Formats	ARTM Tier 0, 1, 2 (PCM/FM + SOQPSK + Multi-H CPM) Others available, consult Lumistar Sales
Modulation Source	Internal PCM Simulator/PRN or External Front-Panel input
Output Power	-60 to +5dBm Max *(approximate)* in 5dB steps
Spurious Outputs	<50 dBc
Pre-Modulation Filter	Automatically selected
FM Deviation	Automatically selected to 0.35 peak

For additional information, please refer to
The User Manual for the LS-11-M3