LMa

TECHNICAL DATA

Digital Hybrid Wireless® UHF Belt Pack Transmitter

- **Digital Hybrid Wireless® Technology**
- **256 synthesized UHF frequencies**
- **DSP controlled dual envelope input limiter**
- **DSP emulations for analog compatibility**
- **Servo bias input preamp**
- **DSP based pilot-tone signal**
- **Wide range, continuously adjustable input gain control**
- **Circulator/Isolator output stage**

The LMa combines an excellent feature set with superb performance in a classic Lectrosonics wireless belt-pack transmitter at a modest cost. 24-bit digital audio is combined with optimized FM to create unprecedented audio quality and RF performance. The RF transmission is an aggressively optimized FM system with +/-75kHz wide deviation for a high audio signal to noise ratio and wide dynamic range. When matched with a Lectrosonics digital hybrid receiver, the system will deliver a full bandwidth, flat audio frequency response up to 20kHz with extremely low distortion.

Compatibility with earlier analog Lectrosonics receivers and even some receiver models from other manufacturers is provided by firmware emulations built into the DSP code. A simple procedure using the frequency and power switches selects the desired operating mode.

Digital Hybrid Wireless® is a revolutionary new patented design that combines digital audio with an analog FM radio link to provide outstanding audio quality and the extended operating range of the finest analog wireless systems. The design overcomes channel noise in a dramatically new way, digitally encoding the audio in the transmitter and decoding it in the receiver, yet still sending the encoded information via an analog FM wireless link. This proprietary algorithm is not a digital implementation of an analog compandor. Instead, it is a technique which can be accomplished only in the digital domain, even though the audio inputs and outputs are analog signals. The process eliminates a compandor and its artifacts.

*US Patent 7,225,135

The innovative servo bias input and standard 5-pin connector provides a programmable, regulated voltage to accommodate a wide variety of electret microphones. It is no longer necessary to install resistive pads for some mics to prevent overload of the input stage, divide the bias voltage down for some low voltage mics, or reduce the limiter range at minimum gain settings.

To simplify wiring connectors, a single configuration, optimized for the LMa, is now available for all microphones. An alternate wiring configuration is also available that works well with the 5-pin inputs on the LMa and earlier Lectrosonics transmitters.

A DSP-based pilot tone system generates one of 256 different ultrasonic tones between 25 kHz and 32 kHz to ensure that the receiver remains muted (squelched) until it receives the pilot tone from the matching transmitter. Even when a competing RF signal is present on the carrier frequency, the receiver will remain squelched. The pilot tone squelch also eliminates noise and interference from spurious RF generated by other transmitters in the same multi-channel system.

Two 16-position rotary switches adjust the operating frequency over a 25.6 MHz bandwidth in 100 kHz increments. The left switch makes 1.6 MHz steps and the right switch makes 100 kHz steps. A removable stainless steel wire belt clip is provided.

LECTROSONICS®
Rio Rancho, NM, USA
www.lectrosonics.com

The LMa is powered by a single 9V battery and provides 50mW of RF output for extended operating range. The battery door rotates to open and close and remains attached to the transmitter housing. Alkaline, rechargeable LiPolymer and lithium battery types may be used.

The housing is machined aluminum, powder coated and laser engraved for ruggedness and legibility. The battery door and control panel are also constructed of machined aluminum, with a rugged anodized finish.

A circulator/isolator in the output stage blocks external RF signals that arrive at the antenna from entering the output amplifier. This greatly reduces intermodulation that otherwise could be generated in the output stage.

The antenna is a super rugged flexible whip made of galvanized steel. A detachable spring wire belt clip is supplied with the unit.

The machined aluminum battery door is hinged to the housing. Battery contacts automatically adjust to a wide variety of alkaline, LiPolymer and lithium 9 V batteries.

Specifications

Operating Frequencies:	Block 470	470.100 - 495.600
	Block 19	486.400 - 511.900
	Block 20	512.000 - 537.500
	Block 21	537.600 - 563.100
	Block 22	563.200 - 588.700
	Block 23	588.800 - 607.900 and 614.100 - 614.300
	Block 24	614.400 - 639.900
	Block 25	640.000 - 665.500
	Block 26	665.600 - 691.100
	Block 27	691.200 - 716.700 (export only)
	Block 28	716.800 - 742.300 (export only)
	Block 29	742.400 - 767.900 (export only)

Frequency Selection:	256 frequencies in 100 kHz steps
Channel Separation:	100 kHz
RF Power output:	50 mW
Pilot tone:	25 to 32 kHz; 5 kHz deviation (400 Series only)
Frequency Stability:	± 0.002%
Deviation:	± 75 kHz max. (400 Series only)
Spurious radiation:	60 dB below carrier
Equivalent input noise:	–120 dBV (A-weighted)
Input level:	Nominal 2 mV to 300 mV, before limiting.
	Greater than 1V maximum, with limiting.

Input impedance:	2k Ohm
Input limiter:	DSP controlled, dual envelope “soft” limiter with greater than 30 dB range
Gain control range:	43 dB; semi-log rotary control
Modulation indicators:	Dual bicolor LEDs indicate modulation of -20, -10, 0 and +10 dB referenced to full modulation

Audio Performance (400 Series Compatibility Mode):

Frequency Response:	90 Hz to 20 kHz (+/-1dB)
THD:	0.2% (typical)

SNR at receiver output:

SmartNR	No Limiting	w/Limiting
OFF	103.5	108.0
NORMAL	107.0	111.5
FULL	108.5	113.0

Note: The dual envelope “soft” limiter provides exceptionally good handling of transients using variable attack and release time constants. Once activated, the limiter compresses 30+ dB of transmitter input range into 4.5 dB of receiver output range, thus reducing the measured figure for *SNR without limiting* by 4.5 dB

Low frequency roll-off:	–12 dB/octave; 70 Hz

Note: The LMa transmitter deliberately rolls off the audio at 70 Hz to reduce the undesired effects of lower frequency noise.)

Controls:	Two position “ON-OFF” power switch
	Audio input gain control on front panel
	Two 16-position rotary switches adjust transmitter frequency
Audio Input Jack:	Switchcraft 5-pin locking (TA5F)
Antenna:	Galvanized steel, flexible wire
Battery:	Precision compartment auto-adjusts to accept any known alkaline 9 Volt battery.
Battery Life:	6 hours (alkaline); 13 hours (lithium); 7 hours LiPolymer
Weight:	6.3 ounces, including lithium 9 V battery and antenna
Dimensions:	3.1 x 2.4 x .75 inches

Emission Designator: 180KF3E

LECTROSONICS®
581 Laser Road NE • Rio Rancho, NM 87124 USA • www.lectrosonics.com
(505) 892-4501 • (800) 821-1121 • fax (505) 892-6243 • sales@lectrosonics.com

5 May 2011