

### Miniature Water Resistant Transmitter

- Waterproof Power/Mute switch
- Water resistant, rugged, machined aluminum housing with noncorrosive, superhard finish
- Digital Hybrid Wireless™ system\*
- 256 synthesized UHF frequencies
- 100 mW output power
- Dual bicolor Modulation LEDs for accurate gain adjustment
- DSP based pilot-tone signal eliminates squelch problems
- Backward compatible to earlier technologies

The rugged, water resistant MM400C is based on Digital Hybrid Wireless™ technology, a revolutionary new design that combines 24-bit digital audio with an analog FM radio link. The result is outstanding audio quality plus the extended operating range of the best analog wireless systems in a package that can withstand the most extreme moisture and temperature environments.

The design overcomes transmission noise in a dramatically new way, digitally encoding the audio bitstream in the transmitter and decoding it in the receiver, yet sending the encoded information via an analog FM wireless link. (See below.)

The MM400C is conveniently powered by a single AA battery, with internal switching power supplies providing constant voltages to the transmitter circuits from the beginning (1.5 volts) to the end (0.85 volts) of battery life. The 100 mW output with an RF circulator/isolator in the output stage provides excellent operating range while virtually eliminating intermodulation problems common in multichannel environments.

#### Digital Hybrid Wireless™ Technology

An industry first, Lectrosonics' Patented Digital Hybrid Wireless™ technology (U.S. Patent No. 7,225,135) uses a proprietary algorithm to encode digital audio information into analog format which can be transmitted in a robust manner over an analog FM wireless link. At the receiver, the encoded signal is captured and decoded back to the original digital audio. This combination offers the superb audio quality of a pure digital system and the outstanding operating range of the finest FM wireless systems. The digital audio chain eliminates a compandor and its artifacts, and provides audio frequency response flat to 20 kHz. The RF link takes advantage of the spectral efficiency characteristics of a highly optimized FM radio system.



#### DSP-Based Pilot Tone

A different DSP-based pilot tone for each of the 256 frequencies in a system's frequency block eliminate fragile crystals, plus squelch problems in multichannel systems where a pilot tone signal can appear in the wrong receiver via intermodulation products.

#### Frequency Agility

Intense multichannel and mobile venues must have a broad selection of frequencies available to alleviate interference problems. 256 frequencies in 100 kHz steps over a 25.6 MHz bandwidth are selectable via two rotary switches located on the bottom of the unit. An O-ring sealed door protects the switches during normal use.

## Battery Power

The transmitter is powered by a single alkaline or lithium AA battery. (Rechargeable NiMH types can also be used.) An O-ring seal around the Battery Compartment Cover prevents water or other liquids from entering. The positive battery contact is spring loaded to maintain a secure connection and to prevent "rattle" as the unit is handled. The waterproof Power On/Off switch further prevents moisture from entering the unit. This switch can also be programmed to mute the audio while leaving the unit powered.

## DSP Compatibility Modes

While the MM400C sounds best when used with a Lectrosonics 400 Series receiver, it also offers backward compatibility with earlier technologies, including the Lectrosonics 200 Series, 100 Series and IFB analog receivers. It also works with some other brands of analog wireless receivers. (Contact Lectrosonics for details.) The selected compatibility mode is indicated at power up by an LED flash code and can be easily set in the field.

## 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
Block 28	716.800 - 742.300
Block 29	742.400 - 767.900

### Frequency selection:

256 frequencies in 100 kHz steps

### RF Power output:

100 mW (nominal)

### Pilot tone:

25 to 32 kHz; 5 kHz deviation  
(in 400 Series Mode)

### Frequency stability:

± 0.002%

### Deviation:

± 75 kHz max. (in 400 Series Mode)

### Spurious radiation:

60 dB below carrier

### Equivalent input noise:

-118 dBV, A-weighted

### Input level:

Nominal 2 mV to 300 mV, before limiting.  
Greater than 1.5V maximum, with limiting.

### Input impedance:

2 kOhm

### Input limiter:

Soft limiter, >30 dB range

### Gain control range:

43 dB; semi-log rotary control

### Modulation indicators:

Dual bicolor LEDs indicate modulation of  
-20, -10, 0, +10 dB referenced to full  
modulation.

## Audio Input

The transmitter input is designed primarily for electret microphones, although modest line level signals can also be used. A watertight 2.5mm microphone plug includes a stainless steel sleeve and silicon tubing strain relief to prevent accidents. The input gain is adjustable over a 43 dB range to provide a perfect level match. Two bicolor LEDs make setting the modulation level a snap.

## Low Frequency Roll-Off

A 12 dB per octave low frequency roll-off is provided in the audio section, with the -3 dB point at 70 Hz. The low frequency roll-off effectively suppresses subsonic audio, such as from air conditioning systems, automobile traffic, etc. Excessive low frequency in the audio input can cause a variety of problems, including driving the transmitter into limiting, excessive power amplifier drain or even damage to loudspeaker systems.

### Low frequency roll-off:

-12 dB/octave; 70 Hz

### Controls:

Front panel knob adjusts audio gain.  
Rotary switches on bottom panel adjust  
transmitter frequency.

### Audio Frequency Response:

80 Hz to 20 kHz, +/-1dB, -3 dB @ 70 Hz  
(The audio is deliberately rolled off at 70 Hz  
using a 12 dB/octave filter. This filter cannot  
be disabled.)

### Signal to Noise Ratio (dB):

#### (overall system, 400 Series mode)

(Note: the dual envelope "soft"  
limiter provides exceptionally  
good handling of transients  
using variable attack and release

time constants. The gradual onset of limiting in the design begins below full  
modulation, which reduces the measured figure for SNR without limiting by 4.5 dB)

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

### Total Harmonic Distortion:

0.2% typical (400 Series mode)

### Audio Input Jack:

2.5 mm Microjack (matches Switchcraft 850  
Microplug)

### Antenna:

Detachable, flexible galvanized steel  
with SMA connector. (50 Ohm antenna port  
also allows connection to test equipment.)

### Battery:

1.5 Volt AA lithium recommended

### Battery Life:

1.5 hours (alkaline); 5.5 hours (lithium);  
4.5 hours (2500 mAh) NiMH

### Weight:

3.6 ozs. (102 grams) with lithium battery,  
no antenna

### Overall Dimensions:

3.03 x 2 x 0.69 inches (not including  
microphone or antenna)

**Emission Designator:** 180KF3E

*Specifications subject to change without notice.*

