

# UHF Plug-on Transmitter



The HM Digital Hybrid® UHF plug-on transmitter features a DSP-based design that allows the transmitter to operate in its native Digital Hybrid Wireless® mode, Lectrosonics 200 Series, 100 Series, IFB product groups, plus two modes for compatibility with analog receivers from other manufacturers. A unique multi-voltage phantom power feature allows the transmitter to be used with virtually any microphone, including high-current condenser types, expanding its usefulness in high-end applications such as motion picture production.

The transmitter provides 256 frequencies in standard frequency blocks, selected with two rotary switches on the side of the housing. The input amplifier uses an ultra low noise op-amp for quiet operation. It is gain controlled with a wide range dual envelope limiter, providing over 30 dB of headroom above full modulation. A 24-bit A-D converter digitizes the audio, then filters supersonic noise above 21 kHz. The resulting signal is encoded with a proprietary algorithm to produce an analog data signal for RF transmission. The underlying RF link is an optimized FM system with +/-75 kHz wide deviation for a high signal to noise ratio.

**Digital Hybrid Wireless®** is a revolutionary new design that combines digital audio with an analog FM radio link to provide outstanding audio quality and the exemplary RF performance 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.

The process eliminates compandor artifacts, expanding the applications to include test and measurement of acoustic spaces.

\*US Patent 7,225,135

- Converts microphones with XLR jacks to wireless operation
- LCD and membrane switches for setup
- Selectable 5, 15 and 48 volt phantom power plus off position for dynamic microphones
- Adjustable low frequency roll-off
- Powered by two AA batteries
- 256 synthesized UHF frequencies
- 100 mW output power
- Rugged machined aluminum housing

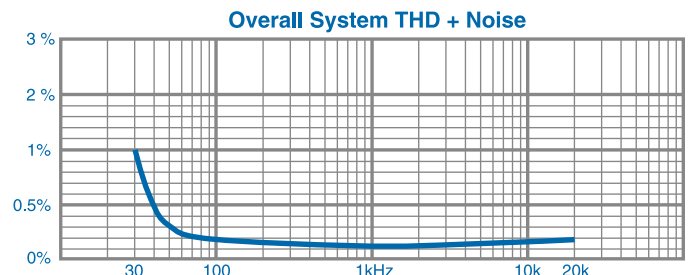
The antenna is formed between the lower housing of the transmitter and the attached system. It functions as a dipole radiator when attached to a hand-held microphone and somewhat like a ground plane antenna when connected into a mixer. The conical shaped collar on the input coupler is made of DuPont™ Delrin® to improve the ERP of the antenna in the uppermost frequency blocks.

## DSP-Based Pilot Tone & Compatibility

The DSP eliminates the need for fragile crystals, plus it allows a different pilot tone for each of the 256 frequencies in the tuning range of a system's frequency block. Individual pilot tones virtually eliminate squelch problems in multichannel systems where a pilot tone signal can appear in the wrong receiver via intermodulation products. A circulator/isolator in the output stage further ensures against intermodulation interference.

## Outstanding Audio Performance

The audio performance of the overall hybrid system is depicted in the graph below. Distortion in the overall system is extremely low over the entire audio bandwidth.

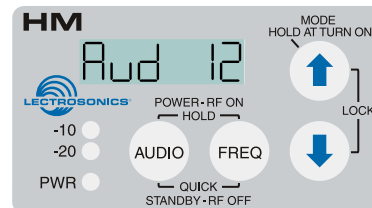




The battery compartment door is hinged to the housing and remains attached to the transmitter when opened. It securely latches in place and applies pressure to the batteries when closed. The two AA batteries are connected in series through a conductive plate on the door.

Setup and adjustments are made with the control panel membrane switches and LCD. The transmitter can be powered up without the transmitter output enabled to allow frequency adjustments without causing interference to other wireless systems nearby. The switches can also be bypassed to prevent accidental changes.

Dual color LEDs indicate audio input level and the power LED changes color under low battery condition.



## Specifications

<b>Frequency selection:</b>	256 frequencies in 100 kHz steps
<b>Operating Frequencies (MHz):</b>	
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 / 614.100 - 614.300
Block 24	614.400 - 639.900
Block 25	640.000 - 665.500
Block 26	665.600 - 691.100
<b>RF Power output:</b>	100 mW (nominal)
<b>Pilot tone:</b>	25 to 32 kHz; 5 kHz deviation (in the 400 Series operating mode)
<b>Frequency stability:</b>	± 0.002%
<b>Deviation:</b>	± 75 kHz (max)
<b>Spurious radiation:</b>	60 dB below carrier
<b>Equivalent input noise:</b>	-125 dBV (A-weighted)
<b>Input level:</b>	Nominal 2 mV to 300 mV, before limiting. Greater than 1V maximum, with limiting.
<b>Input impedance:</b>	300 Ohms
<b>Input limiter:</b>	Dual envelope "soft" limiter; greater than 30 dB range
<b>Gain control range:</b>	55 dB; panel mounted membrane switches
<b>Modulation indicators:</b>	Dual bi-color LEDs indicate modulation of -20, -10, 0, +10 dB referenced to full modulation

### Audio Performance (overall system):

**Frequency Response:** 35 Hz to 20 kHz (+/-1dB);  
Adjustable for -3dB @ 30,50, 70 Hz)  
**Low frequency Roll-off:**  
**THD:** 0.2% (typ. 100 Hz to 20 kHz - see graph)

### SNR at receiver output:

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.

SmartNR	no limiting	w/limiting
OFF	103.5	108.0
NORMAL	107.0	111.5
FULL	108.5	113.0

### Input Dynamic Range:

125 dB (with full Tx limiting)

### Controls & Indicators:

- Power/Phantom "ON-OFF" switch
- Phantom voltage selector switch
- Audio input gain knob
- LCD w/membrane switches
- LED audio level indicators

### Audio Input Jack:

Standard 3-pin XLR (female)

### Phantom Power:

5V @ 18 mA max., 15V @ 15 mA max. and 48 V @ 4 mA max., plus "OFF"

### Antenna:

Housing and attached microphone form the antenna

### Battery:

Two 1.5 Volt AA lithium or rechargeable NiMH recommended

### Battery Life:

AA Batteries	No Phantom*	48V On**
Alkaline	5h 0m	3h 30m
NiMH 2500	9h 15m	7h 0m
Lithium	16h 0m	12h 45m

\*Tested with a dynamic microphone

\*\*Tested with a Sanken CS1 for a phantom-powered microphone

### Weight:

7.5 ozs. (211 grams) w/ AA lithium batteries

### Dimensions:

4.25x1.62x1.38 inches

### Emission Designator:

180KF3E



581 Laser Road NE • Rio Rancho, NM 87124 USA • [www.lectrosonics.com](http://www.lectrosonics.com)  
(505) 892-4501 • (800) 821-1121 • fax (505) 892-6243 • [sales@lectrosonics.com](mailto:sales@lectrosonics.com)

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