

### Watertight Transmitter



Designed for wet or dusty environments, the WM/E01 transmitter features O-ring sealed battery compartments and input jack, a compression sealed antenna port and gasket sealed control panel and back cover. Dual AA batteries provide twice the operating time of earlier watertight transmitter designs. Larger membrane switches and control panel and a highly visible, backlit LCD enhance the user interface.

**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.

This 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 and musical instruments.

- 50mW output power for excellent range
- Machined aluminum, corrosion resistant housing
- Water resistant seals for use in wet environments
- LCD interface with lockout option
- Programmable compatibility modes for use with a wide variety of different receivers
- Servo Bias input circuitry with selectable voltage
- Polarized ferrite isolator output stage

The transmitter delivers a consistent 50mW of output power from the beginning to end of battery life.

In addition to its native Digital Hybrid mode, the DSP can emulate the compandor in the Euro version analog IFB system to make it compatible with those receivers.

The input section features servo bias circuitry with voltages being selectable from the LCD to match the requirements of a wide variety of lavalier microphones. The bias can also be turned off for use with dynamic microphones. A line level setting is provided for use with signal levels up to 5 volts and the low frequency roll-off can be adjusted from 35 to 150 Hz.

A DSP-controlled analog audio limiter is employed ahead of the first mic preamp to protect the entire audio chain from overload. The limiter has a range of more than 30 dB for excellent overload protection and a dual release envelope that makes the limiter acoustically transparent while maintaining low distortion.

The output stage includes an expensive but very effective part called an *isolator*, which prevents external RF signals from entering the output amplifier through the antenna.



## Watertight Connections

The input connector is mounted in a recessed opening which provides a captive seat for the O-ring on the microphone connector. This captures the O-ring allowing it to be tightened firmly.

The antenna is mounted with a compressible strain relief under a flange that presses the strain relief into a tapered opening for a watertight connection.



## Input Limiter

A DSP-controlled analog audio limiter is employed before the analog-to-digital converter. The limiter has a range of more than 30 dB for excellent overload protection. A dual release envelope makes the limiter acoustically transparent while maintaining low distortion. The limiter recovers quickly from brief transients, so that its action is hidden from the listener, but recovers slowly from sustained high levels, to keep

audio distortion low and preserve short term dynamic changes.

The bicolour LEDs on the control panel indicate limiter activity accurately to assist in setting the input gain for optimal signal to noise ratio and dynamic range.

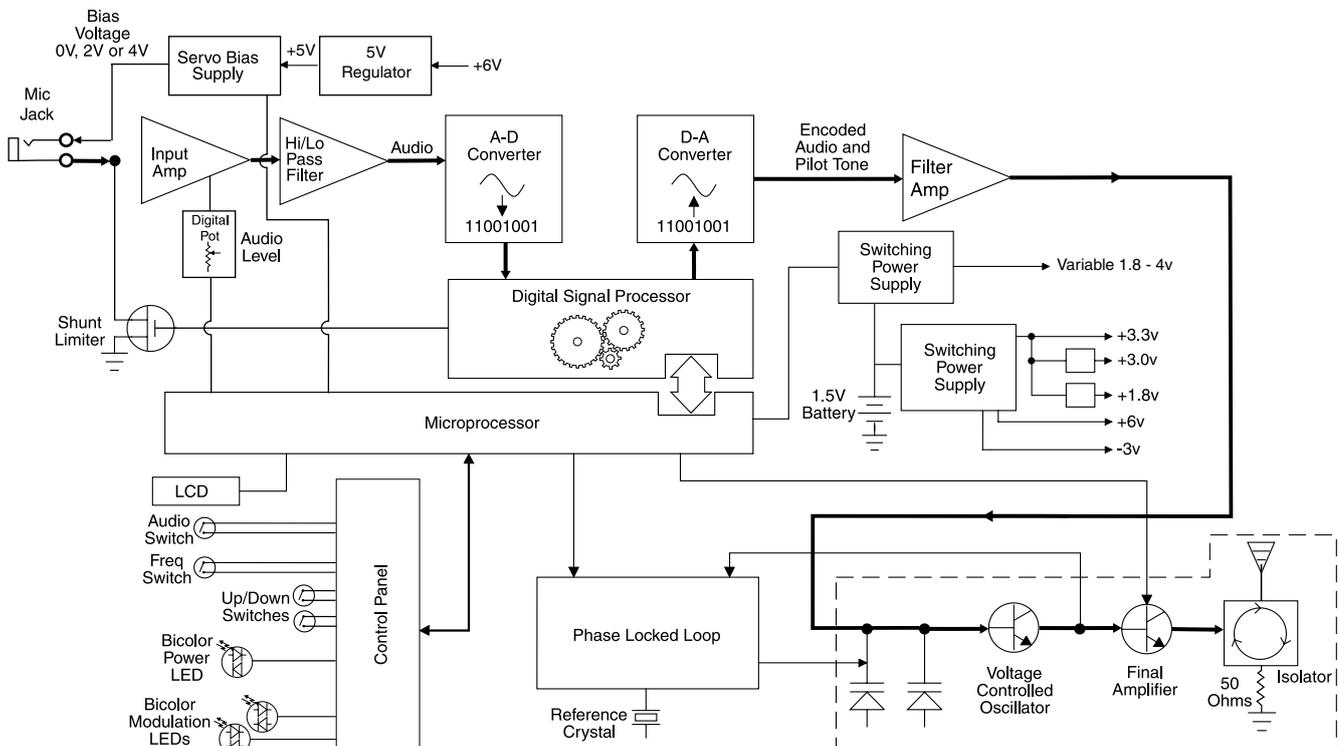
## DSP-Based Pilot Tone

The DSP generated pilot tone eliminates the need for fragile crystals and allows a different pilot tone frequency for each of the 256 carrier frequencies in the tuning range of the wireless system. Individual pilot tones significantly reduce squelch problems in multi-channel systems where a pilot tone signal can appear in the wrong receiver via intermodulation products.

## Output Isolator

The transmitter RF output circuit includes a specialized RF device called an *isolator* using a magnetically polarized ferrite to allow RF signals to pass through to the antenna, but block them from coming backward into the transmitter output section.

The isolator greatly reduces RF intermodulation produced in the transmitter output stages when multiple units are used in close proximity (a few feet apart). The isolator also helps protect the output stage from electrostatic shock delivered to the antenna. Isolators are common in broadcast and commercial applications, but because of their high cost it is unusual to find them in wireless microphone transmitters.



# Specifications

**Operating frequencies:**

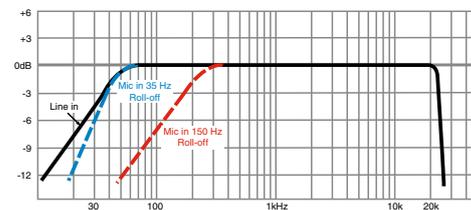
Block 470	470.100 - 495.600	(100 kHz Steps)
Block 19	486.400 - 511.900	(Frequency usage varies by country)
Block 20	512.000 - 537.500	
Block 21	537.600 - 563.100	
Block 22	563.200 - 588.700	
Block 23	588.800 - 614.300	
Block 606	606.000 - 631.500	
Block 24	614.400 - 639.900	
Block 25	640.000 - 665.500	
Block 26	665.600 - 691.100	

<b>Channel Spacing:</b>	100 kHz
<b>Frequency selection:</b>	Control panel mounted membrane switches
<b>RF Power output:</b>	50 mW
<b>Compatibility Modes (6)</b>	Digital Hybrid Wireless® and IFB
<b>Pilot tone:</b>	25 to 32 kHz; 3 kHz deviation (in Digital Hybrid Mode)
<b>Frequency stability:</b>	± 0.002%
<b>Deviation:</b>	± 50 kHz max. (in Digital Hybrid mode)
<b>Spurious radiation:</b>	60 dB below carrier
<b>Equivalent input noise:</b>	-125 dBV, A-weighted
<b>Input level:</b>	
<b>Dynamic mic:</b>	0.5 mV to 50 mV before limiting. Greater than 1 V with limiting.
<b>Electret lavaliere mic:</b>	1.7 uA to 170 uA before limiting. Greater than 5000 uA (5 mA) with limiting.
<b>Line level input:</b>	17 mV to 1.7 V before limiting. Greater than 5 V with limiting.
<b>Input impedance:</b>	
<b>Dynamic mic:</b>	300 Ohms
<b>Electret lavaliere:</b>	Input is virtual ground with servo adjusted constant current bias > 2.7 k Ohms
<b>Line level:</b>	
<b>Input limiter:</b>	Soft limiter, 30 dB range
<b>Bias voltages:</b>	Selectable; 2V, 4V and Off
<b>Gain control range:</b>	44 dB; panel mounted membrane switches
<b>Modulation indicators:</b>	Dual bicolor LEDs indicate modulation of -20, -10, 0, +10 dB referenced to full modulation
<b>Controls:</b>	Control panel with LCD and four membrane switches



AA battery compartments are O-ring sealed

**Low frequency roll-off:** Adjustable from 35 to 150 Hz



**Audio Frequency Response:** 35 Hz to 20 kHz, +/-1 dB (The low frequency roll-off is adjustable - see graph above)

**Signal to Noise Ratio (dB): (overall system, 400 Series mode)**

	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. 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)

<b>Total Harmonic Distortion:</b>	0.2% typical (400 Series mode)
<b>Audio Input Jack:</b>	2.5 mm locking micro; threaded for stainless sleeve on WP connector
<b>Antenna:</b>	Flexible, unbreakable steel cable.
<b>Batteries:</b>	1.5 Volt AA lithium or rechargeable
<b>Battery Life:</b>	50 mW = 13:00 hrs. (2 AA) lithium
<b>Weight:</b>	5.33 oz.. (151 grams) with lithium batteries
<b>Housing Dimensions:</b>	2.98 x 2.55 x 0.77 inches 75.7 x 64.8 x 19.6 mm (including battery caps)
<b>Emission Designator:</b>	180KF3E

Specifications subject to change without notice.



The recess in the battery compartment traps the O-ring for a tight seal.

CE 1313 Ⓢ



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