

WM/E01

Watertight Transmitter and Remote Control

With Digital Hybrid Wireless® Technology

US Patent 7,225,135



CE 1313 ⚠

Fill in for your records:

Serial Number:

Purchase Date:



Table of Contents

General Technical Description	4
Servo Bias Input.....	4
No Pre-Emphasis/De-Emphasis	4
Low Frequency Roll-Off	4
Input Limiter.....	4
Signal Encoding and Pilot Tone	5
Microprocessor Control.....	5
Compatibility Modes.....	5
Control Panel	5
Battery Operation.....	5
Frequency Blocks.....	5
Circulator/Isolator.....	5
Controls and Functions	6
LCD Screen	6
Power LED	6
Audio Input Jack.....	6
Battery Compartment and Thumb Screw.....	6
Modulation LEDs.....	6
AUDIO Button	6
FREQ Button.....	6
Up/Down Arrows	6
Antenna.....	6
About Batteries	7
Battery Compartments	7
Attaching and Removing the Microphone	7
Operating Instructions	8
Power Up and Boot Sequence	8
Power Down.....	8
Standby Mode.....	8
Compatibility, Bias Voltage (phantom power) and LCD Backlight	8
Frequency Selection	9
Remote Control Enable/Disable and Configuring Power Restore	9
Audio LF Roll-off and Gain.....	10
Lock/Unlock Screens	11
Preventing Corrosion	11
Troubleshooting	12
Accessories and Replacement Parts	14
Specifications and Features	15
CE Declaration of Conformity	16
Service and Repair	17
Returning Units for Repair	17

Introduction

The WM/E01 transmitter is designed to resist damage when used in wet or dusty conditions and also offer a comprehensive feature set that makes it equally at home in film and television production and on stage.

A solid machined aluminum housing with a corrosion resistant finish hosts dual battery compartments, a moisture sealed control panel with backlit LCD and enlarged membrane switches. Recessed seats for the O-rings in the battery caps and input jack allow the caps and mic connector to be tightened securely without excessive deformation of the O-rings.

The antenna is made of an extremely durable, multi-strand alloy that will withstand heavy abuse. It is mounted with a compression sealed strain relief that prevents dust and moisture from entering the housing.

As the first stage in the signal processing chain, the input preamp section includes very high quality, low noise components with a wide range of gain adjustment in 1 dB increments and a DSP-controlled input limiter. Dual color LEDs on the control panel accurately indicate audio input level for precise gain adjustment. Easily accessed screens on the LCD simplify setup and adjustments.

Output power is adjustable to provide either extended operating range or extended battery life as needed for the application. The transmitter can be operated from alkaline, lithium or rechargeable NiMH batteries.

The Digital Hybrid Wireless® design (US Patent 7,225,135) combines 24-bit digital audio with analog FM resulting in a system that has the same operating range as analog systems, the same spectral efficiency as analog systems, the same long battery life as analog systems, plus the excellent audio fidelity typical of pure digital systems.

The DSP-based design works with Euro versions of the digital hybrid and IFB receivers.

General Technical Description

Servo Bias Input

The voltage and current requirements of the wide variety of electret microphones used in professional applications has caused confusion and compromises in the wiring needed for wireless transmitters. To address this problem, the unique Servo Bias input circuit provides an automatically regulated voltage over a very wide range of current for compatibility with all microphones.

Digital Hybrid Wireless® Technology

All wireless links suffer from channel noise to some degree, and all wireless microphone systems seek to minimize the impact of that noise on the desired signal. Conventional analog systems use compressors for enhanced dynamic range, at the cost of subtle artifacts (typically “pumping” and “breathing”). Wholly digital systems defeat the noise by sending the audio information in digital form, at the cost of some combination of power, bandwidth and resistance to interference.

Digital Hybrid systems overcome 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 compressor but a technique that can be accomplished only in the digital domain, even though the inputs and outputs are analog.

Because it uses an analog FM link, the Digital Hybrid system enjoys all the benefits of conventional FM wireless systems and it does away with the analog compressor and its artifacts.

No Pre-Emphasis/De-Emphasis

The Digital Hybrid design results in a signal-to-noise ratio high enough to preclude the need for conventional pre-emphasis (HF boost) in the transmitter and de-emphasis (HF roll off) in the receiver. This eliminates the potential for distortion of signals with abundant high-frequency information.

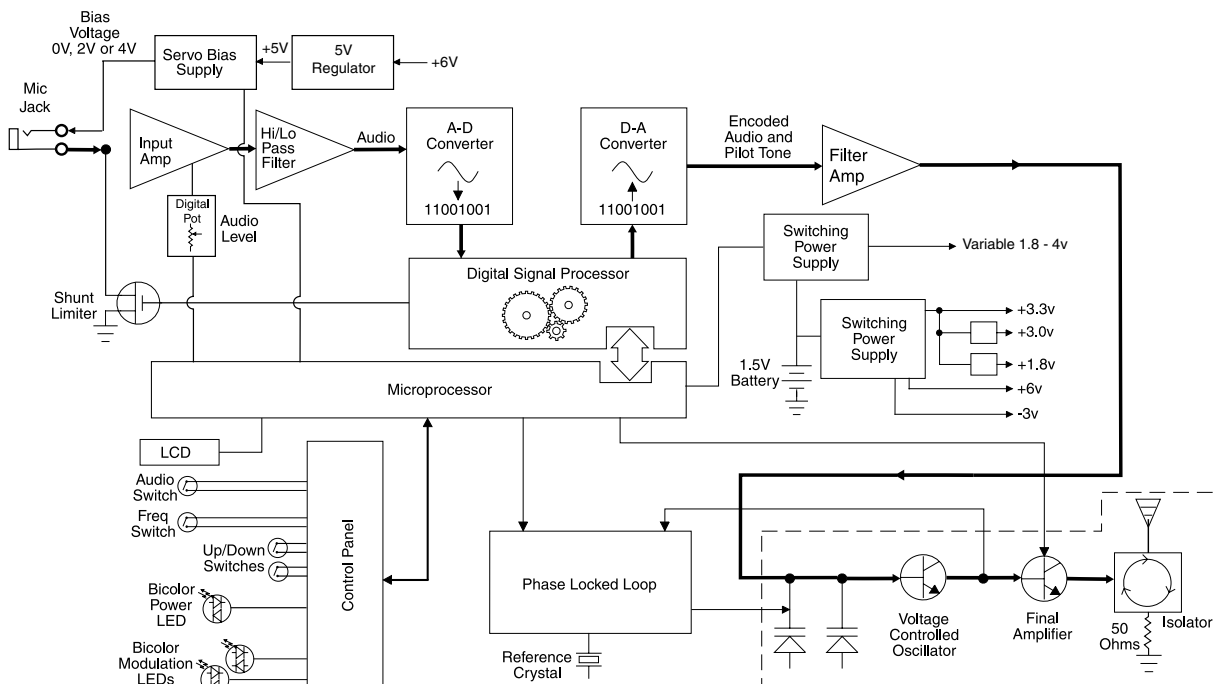
Low Frequency Roll-Off

The low frequency roll-off can be set for a 3 dB down point at 35, 50, 70, 100, 120 and 150 Hz to control subsonic and very low frequency audio content in the audio. The actual roll-off frequency will vary slightly depending upon the low frequency response of the microphone.

Excessive low frequency content can drive the transmitter into limiting, or in the case of high output sound systems, it can even cause damage to loud-speaker systems. The roll-off is normally adjusted by ear while listening as the system is operating.

Input Limiter

A DSP-controlled analog audio limiter is employed before the A-D 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. It can be thought of as two limiters in series, a fast attack and release limiter followed by a slow attack and release limiter. The limiter recovers quickly from brief transients, with no audible side effects, and also recovers slowly from sustained high levels to keep audio distortion low while preserving short term dynamics.



Signal Encoding and Pilot Tone

In addition to controlling the limiter, the DSP also encodes the digitized audio from the A/D converter and adds an ultrasonic pilot tone to control the squelch in the receiver. A pilot tone squelch system provides a reliable method of keeping a receiver output muted (audio mute) even in the presence of significant interference. When the system is operating in the hybrid mode, a different pilot tone frequency is generated for each carrier frequency to prevent inadvertent squelch problems in multi-channel systems.

Microprocessor Control

A microprocessor monitors user command inputs from the control panel buttons and numerous other internal signals. It works intimately with the DSP to ensure the audio is encoded according to the selected Compatibility Mode and that the correct pilot tone is added to the encoded signal.

Compatibility Modes

SMB transmitters are designed to operate with Lectrosonics Digital Hybrid receivers and will yield the best performance when doing so, however, due to the flexibility of digital signal processing, they can also operate with Lectrosonics Euro version IFB receivers.

Control Panel

The control panel includes four membrane switches and an LCD screen to adjust the operational settings. Multi-color LEDs are used to indicate audio signal levels for accurate gain adjustment and for battery status.

Battery Operation

Switching power supplies convert regulated battery voltages to operate various circuit stages with maximum efficiency. With the variety of alkaline, lithium and rechargeable NiMH batteries available today in the AA format, there are many choices to maximize operating time or minimize cost as needed for any application.

The firmware “remembers” the settings when the batteries are exhausted. After new batteries are installed, a quick press of the AUDIO and FREQ buttons will turn the power back on and return to the previous settings. This is a unique behavior that takes place only when the batteries fail during operation. If the unit is turned off manually, a quick press of the buttons will turn it on in the “standby” mode instead.

Because the battery caps make contact with the battery before the cap is seated, the power does not turn back on automatically. This allows both batteries to be installed and the caps tightened before power is restored.

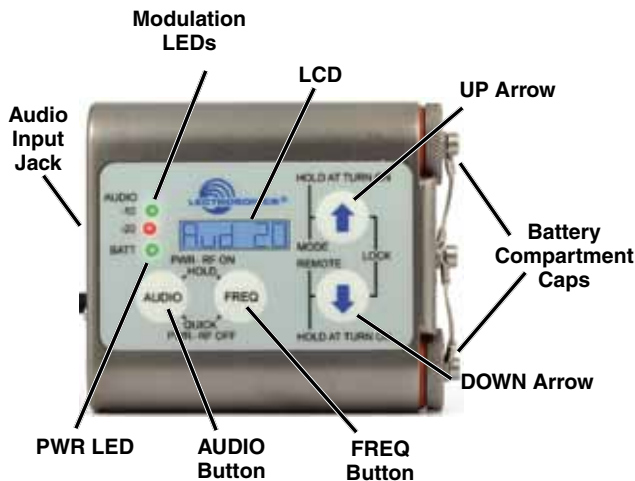
Frequency Blocks

Lectrosonics established a “block” numbering system years ago to organize the range of frequencies available from the low end at 470 MHz band to the upper end at 862 MHz. Each block includes 256 frequencies in 100 kHz steps, which is the maximum switching range of the transmitters.

Circulator/Isolator

The RF output circuit includes a magnetically polarized ferrite called an *isolator* that blocks RF signals entering the transmitter antenna from external sources from traveling back into the final amplifier. This greatly reduces RF intermodulation produced when multiple transmitters are used in close proximity to one another (several feet apart). The isolator also provides additional RF output stage protection against static shock.

Controls and Functions



LCD Screen

The display is a highly visible backlit LCD with screens for making all setup and level adjustments. The transmitter can be powered up with or without the RF output turned on. With the RF output turned off, all adjustments can be made without creating interference for other wireless systems in the vicinity.

For normal powering up and down, a countdown appears in the LCD. The buttons must be held in for the duration of the countdown, which helps to prevent accidentally turning the transmitter on or off.

Power LED

The PWR LED glows green when the battery is good. The color changes to red when there is about 30 minutes of operation left with the recommended lithium battery. An alkaline battery will have about 20 minutes of life left. When the LED begins to blink red, there are only a few minutes of life.

Note: A NiMH rechargeable battery will give little or no warning when it is depleted. If you wish to use NiMH batteries, we recommend trying fully charged batteries in the unit and using the battery timer feature available in most receivers to determine the available operating time.

A weak battery will sometimes cause the PWR LED to glow green immediately after the unit is turned on, but will soon discharge to the point where the LED will turn red or the unit will turn off completely. When the transmitter is in SLEEP mode, the LED blinks green every few seconds.

Audio Input Jack

This is a threaded locking connector that accepts the Lectrosonics watertight WP connector.

Battery Compartment and Thumb Screw

The large knurled thumbscrews are retained to keep the batteries and maintain solid battery contact. The lanyard keeps the battery caps attached, but it can be removed if desired using a 1/16 inch hex key (Allen wrench).

Modulation LEDs

Proper input gain adjustment is critical to ensure the best audio quality. Two red/green LEDs will glow to accurately indicate modulation levels. The input circuitry includes a wide range DSP-controlled limiter to prevent distortion during high peak levels.

It is important to set the gain (audio level) high enough to achieve full modulation during louder peaks in the audio. The DSP-controlled limiter can handle peaks over 30 dB above full modulation, so with an optimum setting, the LEDs will flash red during use. If the LEDs never flash red, the gain is too low. The **-20 LED** turns red at 0 dB (full modulation).

Signal Level	-20 LED	-10 LED
Less than -20 dB	● Off	● Off
-20 dB to -10 dB	● Green	● Off
-10 dB to +0 dB	● Green	● Green
+0 dB to +10 dB	● Red	● Green
Greater than +10 dB	● Red	● Red

AUDIO Button

The AUDIO button is used to display the gain and low frequency roll-off settings. The UP and DOWN arrows adjust the values. This button is also used with the FREQ button to enter standby mode and to power the transmitter on or off.

FREQ Button

The FREQ Button displays the selected operating frequency and also toggles the LCD between displaying the actual operating frequency in MHz and a two-digit hexadecimal number that corresponds to the equivalent Lectrosonics Frequency Switch Setting. This button is also used with the AUDIO button to enter standby mode and to power the transmitter on or off.

Up/Down Arrows

The Up and Down arrow buttons are used to select the values on the various setup screens and to lock out the control panel. Pressing both arrows simultaneously enters the lock countdown. When an attempt is made to change a setting while the control panel is locked, a message will flash on the LCD as a reminder that the unit is locked. Once locked, the buttons can only be unlocked by removing the battery, or with the RM remote control.

Antenna

The fixed whip antenna is constructed with a flexible, woven, galvanized steel mesh cable.

About Batteries

The transmitter is powered by two AA batteries. Lithium batteries are recommended for longest life. At 50 mW, the runtime is typically over 14 hours with lithium batteries.

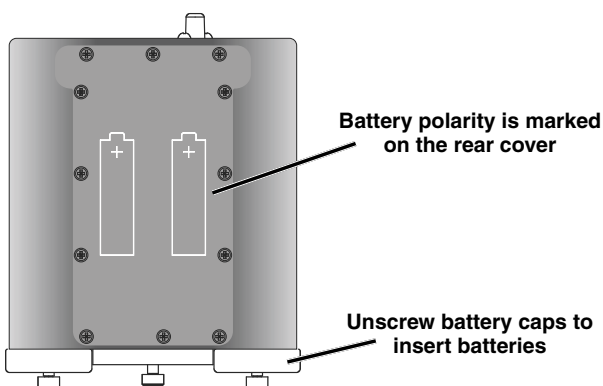
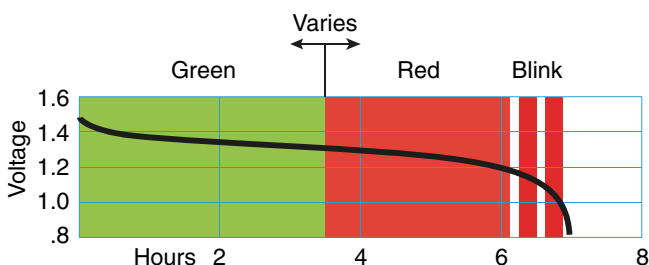
Rechargeable NiMH batteries can also be used, but the capacity diminishes over time with each successive recharging cycle. Test the batteries by fully charging them and then running them down in the transmitter to determine the available running time. Most Lectrosonics receivers have a timer function that will automatically stop when the transmitter shuts down at the end of battery life, so you will be able to accurately see the time available.

Alkaline batteries can also be used, but the runtime is shorter at the full output power. The available runtime also varies significantly with different brands of AA alkaline batteries.

Note: Standard zinc-carbon batteries marked “heavy-duty” or “long-lasting” are not adequate.

The PWR LED glows green when the battery is good. The color changes to red at a mid-point of operating life, and will continue to glow red until the battery gets close to the end of its life. When the LED begins to blink red, there are only a few minutes remaining.

The exact point at which the LED turns red will vary with battery brand and condition, temperature and current drain. The LED is simply a reminder intended to catch your attention, not an exact indicator of remaining time.



Battery Compartments

The battery compartments are a rugged, straight-forward design with a recessed entry that captures the O-ring when the cap is tightened. The spring contact on the cap maintains solid contact on the battery regardless of its exact length.



The O-rings should be kept clean and dry, and coated with petroleum jelly on a regular basis. See page 11 for more information on preventing corrosion.

Attaching and Removing the Microphone

The threaded WP watertight plug on the microphone cable fits into a recessed jack on the top panel. The recess in the opening retains the O-ring when the plug is tightened. The Lectrosonics M152WP lavalier microphone is supplied with the WP plug already installed. Other microphones can also be terminated with this plug by following the instructions included with the WP connector kits.



Treat O-ring with petroleum jelly before connecting

Operating Instructions

Power Up and Boot Sequence

Simultaneously press and hold the AUDIO and FREQ buttons until the startup count is completed. The screen will display a count from 1 to 3 as the unit boots up, then it switches to the Audio screen. As the unit turns on, the Modulation LEDs and PWR LED all glow red, then green, and then revert to normal operation.



The LCD displays a boot sequence which consists of four screens ending with the audio screen similar to this example:

- Company name: Lectro
- Frequency block/Firmware Ver.: b21r1.1
- Power level: Pr 50
- Compatibility mode: CP Hbr
- Audio (Input gain): Aud 22

Power Down



Simultaneously press and hold the AUDIO and FREQ buttons while

observing that the word "OFF" appears in the LCD along with a counter. The screen will display a countdown from 3 to 1 and the unit will then turn off.

Note: If the AUDIO and FREQ buttons are released before the LCD goes blank at the end of the countdown, the unit will not turn off. Instead, it will stay energized and the display will return to the previous screen.

Standby Mode



Quickly press both AUDIO and FREQ buttons to enter the "standby" mode.

In this mode the RF output is turned off so adjustments can be made without interfering with other systems operating in the same location. The LCD displays **rf OFF** to remind you that the unit is not transmitting.

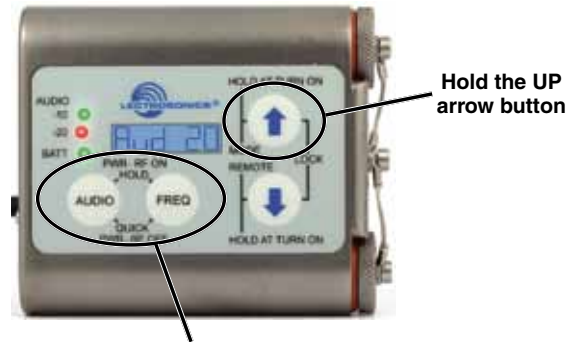
Use the AUDIO and FREQ buttons to access the various setup screens. When the adjustments are complete, press both the AUDIO and FREQ buttons briefly to save the settings and turn the unit off.

Compatibility, Bias Voltage (phantom power) and LCD Backlight

Four different setup screens are accessed in a setup mode that is accessed with a special button sequence.

- Compatibility Mode
- Bias Voltage (phantom power)
- LCD Backlight Settings

Hold the UP arrow button and simultaneously press the AUDIO and FREQ buttons. The setup screen will appear. Each successive press of the AUDIO button will step through the available setup screens.



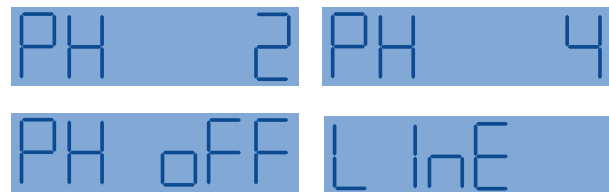
Then press the AUDIO and FREQ buttons at the same time

Note: The unit is automatically set to "standby" in this setup mode, however, the **rf OFF** reminder will not be displayed.

Bias Voltage (phantom power)

The transmitter features unique Servo Bias input circuitry that automatically adjusts the current to maintain a selected bias voltage for the microphone. This effectively overcomes a traditional problem with variations in output levels and power supply currents of different microphones.

Hold the UP arrow button, then press the **Audio** and **Freq** buttons together to enter the setup screen with the RF output turned off.



Press the UP and DOWN arrows to select the desired setting:

- **PH 2** Bias at 2 volts for electret mics
- **PH 4** Bias at 4 volts for electret mics
- **PH OFF** Bias turned off for dynamic mics
- **L InE** Bias turned off; live level impedance

The correct bias voltage will be specified by the microphone manufacturer. 4 volts is typical for most electret lavalier microphones. 2 volts is preferred by some mic manufacturers such as Countryman for the models B6 and E6.

Compatibility Mode

In addition to its native Digital Hybrid mode, the transmitter will also operate with Lectrosnocs IFB receivers.



From this screen, use the UP and DOWN arrows to select the desired mode.

- CP Hbr: Digital Hybrid receivers
- CP IFb: IFB Series mode

LCD Backlight Settings



The backlight on the display can be set to stay on all the time or to turn off after either 30 seconds or 5 minutes of inactivity on the panel switches. The backlight will turn on and the timer will start over when a button is pressed. Use the UP and DOWN arrow buttons to select the desired setting.

Frequency Selection

The frequency can be displayed either in MHz or as a two-digit hexadecimal number and can be set in the Standby Mode or when the transmitter is powered up in the normal operating mode.



The hexadecimal numbering system is unique to Lectrosnocs where two alphanumeric characters correspond to the left and right switch settings on earlier analog transmitters that had mechanical rotary switches to adjust frequency.

- 1) Press the FREQ button to select either the MHZ screen or the hexadecimal screen.
- 2) While holding the FREQ button, use the Up or Down arrow buttons to move the operating frequency up or down in 100 kHz increments from the current setting.

Remote Control Enable/Disable and Configuring Power Restore

These two settings are made with a screen that is accessed with a special button sequence.



Hold the DOWN arrow button

Then press the AUDIO and FREQ buttons at the same time

The remote control screen setup will appear first. When either the AUDIO or FREQ button is pressed, the screen will switch to the power restore setup screen. Pressing either button again will return the unit to the “standby” mode with the RF output turned off.

To access these screens again, turn the unit off and press the three buttons as shown above to start over.

Configuring for Power Restore

The second setup screen in this mode determines how the transmitter is powered up again after the batteries have become exhausted in normal operation the unit has shut down. **PbAC 0** turns the power restore function off and **PbAC 1** turns it on.



When this function is turned on, the unit will power up to normal operation with a brief press of the AUDIO and FREQ buttons after the batteries have been replaced.

When this function is turned off, the AUDIO and FREQ buttons need to be held in for the completion of the count to turn the unit back on for normal operation.

This is a unique behavior that takes place only when the batteries fail during operation. If the unit is turned off manually, a quick press of the buttons will turn it on in the “standby” mode instead.

The firmware is written this way because the battery caps make contact with the battery before the cap is seated, and the fact that there are two separate battery caps to tighten. This allows both batteries to be installed and the caps tightened before power is restored. It also makes turning the unit back on easier when wearing gloves since the buttons do not need to be held in.

Enable/Disable Remote Control Functions

To enable the transmitter to respond to signals from the RM/E remote control unit, use the UP and DOWN arrow buttons to select **rc on** on the setup screen. To disable this function, select **rc off**.



If a remote control signal is detected but the function is turned off, the message **rc off** will be displayed briefly on the transmitter's LCD to confirm that a valid signal was received, but that the transmitter is not configured to respond to it.

Refer to the section of this manual entitled **Optional RM/E Remote Control** for details on the features and operation of the remote control.

Audio LF Roll-off and Gain

The Audio screen will appear after the boot sequence into the normal mode. When turned on into the "standby" mode, **rf OFF** will appear on the display and pressing the AUDIO button will switch to the Audio screen.

The Audio screen is used to adjust input gain from 0 to +44 dB, and the low frequency roll-off from 35 to 150 Hz. Each time the AUDIO button is pressed, the display will switch back and forth between the two screens. Press and hold the AUDIO button and use the UP and DOWN arrows to make adjustments.

Adjusting the Low Frequency Roll-off



It is possible that the low frequency roll-off point could affect the gain

setting, so it's generally good practice to make this adjustment before adjusting the input gain. Press and hold the AUDIO button while selecting the desired roll-off frequency with the UP and DOWN arrows. The roll-off frequency can be set to 35, 50, 70, 100, 120 and 150 Hz.

Adjusting Audio Level (Gain)



The audio input level (gain) can be adjusted with the unit in the "stand-

by" mode or while powered up in normal operation. The control panel Modulation LEDs indicate the audio level and limiter activity. Once set, the transmitter's audio level setting **should not** be used to control the volume of your sound system or recorder levels. This gain adjustment matches the transmitter gain with the microphone's output level, the user's voice level and the position of the microphone.

It is desirable to set the gain so that some limiting occurs on louder peaks. The limiter is very transparent and its effect is not audible until the system is close to overload. In other words, don't be shy about turning up the gain. In fact, it is a good idea to turn the gain up to maximum and listen for distortion or compression to get a feel for how much headroom the system actually has.

Signal Level	-20 LED	-10 LED
Less than -20 dB	● Off	● Off
-20 dB to -10 dB	● Green	● Off
-10 dB to +0 dB	● Green	● Green
+0 dB to +10 dB	● Red	● Green
Greater than +10 db	● Red	● Red

Note: Different voices will usually require different gain settings, so check this adjustment as each new person uses the system. If several different people will be using the transmitter and there is not time to make the adjustment for each individual, adjust it for the loudest voice.

Warning: If the wireless system is connected to a live sound system, turn the sound system level down first to avoid severe feedback.

- 1) Position the microphone in the location where it will be used in actual operation.
- 2) Place the transmitter in the "standby" mode or turn it on for normal use.
- 3) While speaking or singing into the microphone at the same voice level that will be used, observe the LEDs on the control panel. Hold the AUDIO button and press the UP or DOWN arrow buttons to adjust the gain until the -20 LED flickers red on louder peaks. This LED turns red at the instant full modulation takes place and the very onset of limiting. The red color does not indicate overload or clipping.



This will maximize the audio signal to noise ratio of the system and provide plenty of headroom (limiter range) to handle even louder peaks that could occur.

If the unit was set up in "standby" mode, it will be necessary to turn the transmitter off, then power it up again in normal operation so the RF output will be on. Then the other components in the sound or recording system can be adjusted.

Lock/Unlock Screens

The control panel buttons can be locked out to avoid inadvertent changes in the settings or turning the unit off unintentionally. Simultaneously pressing and holding both the UP and DOWN arrow buttons during normal operation starts a countdown timer.



The timer starts at three and counts down to zero. When the timer reaches zero, the transmitter's controls are locked.

With the controls locked, the AUDIO and FREQ buttons can still be used to display current settings. Any attempt to change a setting by pressing either the Up or Down arrow button will result in an on-screen **Loc** reminder that the controls are locked.



Once the transmitter is locked, it cannot be unlocked or powered off using the buttons. The only ways to unlock a locked transmitter are to remove the battery or unlock it via the RM remote control.

Preventing Corrosion

Whenever the transmitter has been exposed to moisture or perspiration, follow the instructions below to minimize the risk of corrosion.

DRY THE UNIT BEFORE REMOVING THE MICROPHONE CONNECTOR OR BATTERY CAPS.

If the transmitter has been exposed to salt water, rinse it with fresh water and then dry it thoroughly with a clean paper towel or cloth.

Dry the exterior of the transmitter with a clean paper towel or cloth. Remove all moisture around the battery caps and microphone cable connector.

After removing the battery caps and microphone connector, wipe off any residual moisture around the battery compartment and microphone jack openings and on the battery caps and microphone connector.

The O-rings should be coated with Vaseline® or an equivalent petroleum jelly* before each use to ensure the seals are watertight.

DO NOT USE ANYTHING OTHER THAN PURE PETROLEUM JELLY TO LUBRICATE THE O-RINGS.
Silicon-based lubricants will dissolve the O-rings.

Store the unit with no batteries installed, battery caps removed and the microphone disconnected. This will allow any buildup of humidity and moisture to evaporate.

**Vaseline is a registered trademark of Conopco, Inc*

Troubleshooting

Before going through the following chart, be sure that you have a good battery in the transmitter. It is important that you follow these steps in the sequence listed.

SYMPTOM

POSSIBLE CAUSE

TRANSMITTER PWR LED OFF

- 1) Battery is inserted backwards or dead.
- 2) Transmitter not powered up. (See *Operating Instructions, Power UP and Boot Sequence.*)

TRANSMITTER PWR LED BLINKS GREEN EVERY FEW SECONDS, TRANSMITTER DOES NOT RESPOND OTHERWISE

- 1) Transmitter has been put to sleep by the remote control. Either use the remote control to wake it up again or remove and reinsert the transmitter's battery.

AUDIO LEVEL LEDs NOT LIGHTING

- 1) Gain control set to minimum.
- 2) Battery is dead or installed backwards. Check PWR LED.
- 3) Mic capsule is damaged or malfunctioning.
- 4) Mic cable damaged or mis-wired.

RECEIVER RF INDICATOR OFF

- 1) Transmitter not turned on, or is in Standby Mode.
- 2) Transmitter battery is dead.
- 3) Receiver antenna missing or improperly positioned.
- 4) Transmitter and receiver not on same frequency. Check switches/display on transmitter and receiver.
- 5) Transmitter and receiver not on same frequency block.
- 6) Operating range is too great.
- 7) Defective transmitter antenna.

NO SOUND (OR LOW SOUND LEVEL), RECEIVER INDICATES PROPER AUDIO MODULATION

- 1) Receiver output level set too low.
- 2) Receiver output disconnected, or cable defective or mis-wired.
- 3) Sound system or recorder input is turned down.

DISTORTED SOUND

- 1) Transmitter gain (audio level) is far too high. Check audio level LEDs and receiver audio levels during use.
- 2) Receiver output may be mismatched with the sound system or recorder input. Adjust output level on receiver to the correct level for the recorder, mixer or sound system. (Use the receiver's Tone function to check level.)
- 3) Transmitter is not set to same frequency as receiver. Check that operating frequency on receiver and transmitter match.
- 4) Receiver/Transmitter Compatibility Mode mismatched.

EXCESSIVE FEEDBACK

- 1) Transmitter gain (audio level) too high. Check gain adjustment and/or reduce receiver output level.
- 2) Talent standing too close to speaker system.
- 3) Mic is too far from user's mouth.

SYMPTOM

POSSIBLE CAUSE

HISS AND NOISE -- AUDIBLE DROPOUTS

- 1) Transmitter gain (audio level) far too low.
- 2) Receiver antenna missing or obstructed.
- 3) Transmitter antenna broken or missing.
- 4) Operating range too great.
- 5) Signal interference. Turn off transmitter. If receiver's signal strength indicator does not drop to nearly zero, this indicates an interfering signal may be the problem. Try a different operating frequency.

“Loc” APPEARS IN DISPLAY WHEN ANY BUTTON IS PRESSED

- 1) Control Panel is locked. (See *Operating Instructions, Locking and Unlocking the Control Panel.*)

“Hold” APPEARS IN DISPLAY WHEN ARROW BUTTONS ARE PRESSED

- 1) Reminder that it is necessary to hold down the AUDIO or FREQ button to make adjustments to the audio gain or frequency settings.

“PLL” APPEARS IN DISPLAY

- 1) Indication that the PLL is not locked. This is a serious condition that requires factory repair. It may be possible to operate on another frequency far removed from the one that was selected when the condition was indicated.

Accessories and Replacement Parts

WMBCWIRE

Belt clip; wire style; optional.

WMBCSL

Belt clip; spring loaded; included with transmitter.

WPMC-3

Watertight connector kit, 3 piece, to terminate lavalier microphones for use with the WM transmitter.



WPMC-10

Watertight connector kit, 10 piece, to terminate lavalier microphones for use with the WM transmitter.



Battery Cap

TBA

Battery Cap Lanyard

TBA

O-ring for Battery Cap

TBA

Specifications and Features

Operating frequencies:

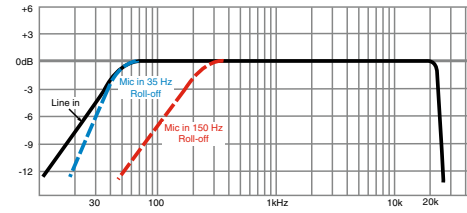
- Block 470 470.100 - 495.600
- Block 19 486.400 - 511.900
- Block 20 512.000 - 537.500
- Block 21 537.600 - 563.100
- Block 22 563.200 - 588.700
- Block 23 588.800 - 614.300
- Block 606 606.000 - 631.500
- Block 24 614.400 - 639.900
- Block 25 640.000 - 665.500
- Block 26 665.600 - 691.100
- Block 27 691.200 - 716.700
- Block 28 716.800 - 742.300
- Block 29 742.400 - 767.900
- Block 30 768.000 - 793.500
- Block 31 793.600 - 819.100
- Block 32 819.200 - 844.700
- Block 33 844.800 - 861.900

(100 kHz Steps)

(Frequency usage varies by country)

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

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)

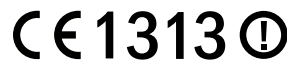
Signal to Noise Ratio (dB): (overall system, 400 Series mode)

	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)

- Total Harmonic Distortion:** 0.2% typical (400 Series mode)
- Audio Input Jack:** 2.5 mm locking micro; threaded for stainless sleeve on WP connector
- Antenna:** Flexible, unbreakable steel cable.
- Batteries:** 1.5 Volt AA lithium or rechargeable
- Battery Life:** 50 mW = 14.5 hrs. (2 AA) lithium
- Weight:** 5.33 oz.. (151 grams) with lithium batteries
- Housing Dimensions:** 2.98 x 2.55 x 0.77 inches
75.7 x 64.8 x 19.6 mm (including battery caps)
- Emission Designator:** 180KF3E

Specifications subject to change without notice.



CE Declaration of Conformity

CE 1313 Ⓢ

R&TTE Directive (1999/5/EC)



25 June 2012

CE - Declaration of Conformity

We, Lectrosonics Inc.
581 Laser Road NE
Rio Rancho, New Mexico 87124 USA

declare under our sole responsibility that the product:

WM/E01

to which this declaration relates is in conformity with the following standards:

EN 300 422-2 V1.2.2 (2008-03)
EN 301 489-9 V1.4.1 (2007-11)
EN 60950-1: 2006 + A1:2010

Test report no. R1203061-422A
 Date of test report: 25 April 2012
 Test report no. R1203061-12A
 Date of test report: 25 April 2012
 Test report no. R1203061-3
 Date of test report: 18 April 2012

Robert Cummings
 Robert Cummings
 V.P. Engineering
 Lectrosonics, Inc.



Opinion Number: R203061

DIRECTIVE 1999/5/EC NOTIFIED BODY STATEMENT OF OPINION

Bay Area Compliance Laboratories Corp.

Date of Issue:	2012-06-01
Applicant Details:	Lectrosonics, Inc. 581 Laser Road, Rio Rancho, NM 87124, USA
Trade Name/Model:	WM/E01
Equipment Type:	Transmitter
Serial Number:	101, 102, 103
Network Interface:	Wi-Fi
Frequency Range:	430.10 - 430.90 MHz
Channel Spacing:	100KHz
RF Output Power:	Switchable: 21 or 30 mW
Modulation Type:	FSK
Notified Body (NB):	Bay Area Compliance Laboratories Corp. 1710 Anacostand Ave., Sunnyvale, CA 94089, USA Tel: (408) 752-9162 Fax: (408) 752-9164 www.bacalab.com

Essential Requirements	Specifications / Standards	Document Identification	Result
Radio Spectrum Article 3(1)	EN 300 422-2 V1.2.2 (2008-03)	R1203061-422A	Compliant
EMC Article 3(1)(b)	EN 301 489-9 V1.4.1 (2007-11)	R1203061-12A	Compliant
Safety Article 3(1)(c)	EN 60950-1:2006 + A1:2010	R1203061-3	Compliant

The opinion is according to Council Directive (1999/5/EC) on Radio equipment and Telecommunications terminal equipment of the devices covered therein and textual recognition of their conformity is that the apparatus identified above complies with the requirements of that Directive as set forth.

Marking: It is recommended that the product bear the CE mark. The notified body (assuming no request to the right) may enter all the relevant information here into the CE mark and a Manufacturer's Declaration and Declaration of Conformity, that shall be the product's Declaration of Conformity.

Number of Annexes to this certificate: 1

Authorized By: *John Chan*
 John Chan, Technical Expert

CE 1313 Ⓢ

Bay Area Compliance Laboratories Corp. 1710 Anacostand Ave., Sunnyvale, CA 94089, U.S.A.
 Tel: (408) 752-9162 Fax: (408) 752-9164

The WM/E01 may be operated in:

AT	BE	BG	CH	CY	CZ
DE	DK	EE	FI	FR	GR
HU	IE	IS	LT	LU	LV
MT	NL	NO	PT	RO	SE
SI	SK	UK			

The use of the WM/E01 requires a license and is subject to national restrictions on frequency selection and channel spacing.

Service and Repair

If your system malfunctions, you should attempt to correct or isolate the trouble before concluding that the equipment needs repair. Make sure you have followed the setup procedure and operating instructions. Check the interconnecting cables and then go through the **Troubleshooting** section in this manual.

We strongly recommend that you **do not** try to repair the equipment yourself and **do not** have the local repair shop attempt anything other than the simplest repair. If the repair is more complicated than a broken wire or loose connection, send the unit to the factory for repair and service. Don't attempt to adjust any controls inside the units. Once set at the factory, the various controls and trimmers do not drift with age or vibration and never require readjustment. **There are no adjustments inside that will make a malfunctioning unit start working.**

LECTROSONICS' Service Department is equipped and staffed to quickly repair your equipment. In warranty repairs are made at no charge in accordance with the terms of the warranty. Out-of-warranty repairs are charged at a modest flat rate plus parts and shipping. Since it takes almost as much time and effort to determine what is wrong as it does to make the repair, there is a charge for an exact quotation. We will be happy to quote approximate charges by phone for out-of-warranty repairs.

Returning Units for Repair

For timely service, please follow the steps below:

- A.** DO NOT return equipment to the factory for repair without first contacting us by email or by phone. We need to know the nature of the problem, the model number and the serial number of the equipment. We also need a phone number where you can be reached 8 A.M. to 4 P.M. (U.S. Mountain Standard Time).
- B.** After receiving your request, we will issue you a return authorization number (R.A.). This number will help speed your repair through our receiving and repair departments. The return authorization number must be clearly shown on the **outside** of the shipping container.
- C.** Pack the equipment carefully and ship to us, shipping costs prepaid. If necessary, we can provide you with the proper packing materials. UPS is usually the best way to ship the units. Heavy units should be "double-boxed" for safe transport.
- D.** We also strongly recommend that you insure the equipment, since we cannot be responsible for loss of or damage to equipment that you ship. Of course, we insure the equipment when we ship it back to you.

Lectrosonics USA:

Mailing address:
Lectrosonics, Inc.
PO Box 15900
Rio Rancho, NM 87174
USA

Shipping address:
Lectrosonics, Inc.
581 Laser Rd.
Rio Rancho, NM 87124
USA

Telephone:
(505) 892-4501
(800) 821-1121 Toll-free
(505) 892-6243 Fax

Web:
www.lectrosonics.com

E-mail:
sales@lectrosonics.com

Lectrosonics Canada:

Mailing Address:
49 Spadina Avenue,
Suite 303A
Toronto, Ontario M5V 2J1

Telephone:
(416) 596-2202
(877) 753-2876 Toll-free
(877-7LECTRO)
(416) 596-6648 Fax

E-mail:
Sales: colinb@lectrosonics.com
Service: joeb@lectrosonics.com

LIMITED ONE YEAR WARRANTY

The equipment is warranted for one year from date of purchase against defects in materials or workmanship provided it was purchased from an authorized dealer. This warranty does not cover equipment which has been abused or damaged by careless handling or shipping. This warranty does not apply to used or demonstrator equipment.

Should any defect develop, Lectrosonics, Inc. will, at our option, repair or replace any defective parts without charge for either parts or labor. If Lectrosonics, Inc. cannot correct the defect in your equipment, it will be replaced at no charge with a similar new item. Lectrosonics, Inc. will pay for the cost of returning your equipment to you.

This warranty applies only to items returned to Lectrosonics, Inc. or an authorized dealer, shipping costs prepaid, within one year from the date of purchase.

This Limited Warranty is governed by the laws of the State of New Mexico. It states the entire liability of Lectrosonics Inc. and the entire remedy of the purchaser for any breach of warranty as outlined above. NEITHER LECTROSONICS, INC. NOR ANYONE INVOLVED IN THE PRODUCTION OR DELIVERY OF THE EQUIPMENT SHALL BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE, CONSEQUENTIAL, OR INCIDENTAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THIS EQUIPMENT EVEN IF LECTROSONICS, INC. HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL THE LIABILITY OF LECTROSONICS, INC. EXCEED THE PURCHASE PRICE OF ANY DEFECTIVE EQUIPMENT.

This warranty gives you specific legal rights. You may have additional legal rights which vary from state to state.

