

EM WAVE

WIRELESS MICROPHONE SYSTEMS

OWNER'S MANUAL



Important Safety Instructions

1. Read, follow, and keep these instructions. Heed all warnings.
2. Do not expose to extreme cold or heat.
3. Do not expose to rain, use it in water, or in damp or wet conditions.
4. Do not expose to any excessive dust and other foreign particles.
5. Keep clean by washing outside with a dry cloth.
6. Keep in the case when not in use.
7. Never attempt to disassemble.
8. Mackie cannot be held responsible for any damage caused by improper use or modifications.
9. This device complies with Part 15 of the FCC Rules [and contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s)]. Operation is subject to the following two conditions:
 - (1) this device may not cause harmful interference, and
 - (2) this device must accept any interference received, including interference that may cause undesired operation.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

 - (1) l'appareil ne doit pas produire de brouillage, et
 - (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
10. **NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
 - Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and the receiver.
 - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 - Consult the dealer or an experienced radio/TV technician for help.

CAUTION: Changes or modifications to this device not expressly approved by LOUD Audio, LLC. could void the user's authority to operate the equipment under FCC rules.

11. Exposure to extremely high noise levels may cause permanent hearing loss. Individuals vary considerably in susceptibility to noise-induced hearing loss, but nearly everyone will lose some hearing if exposed to sufficiently intense noise for a period of time. The U.S. Government's Occupational Safety and Health Administration (OSHA) has specified the permissible noise level exposures shown in the chart. According to OSHA, any exposure in excess of these permissible limits could result in some hearing loss:

Duration, per day in hours	Sound Level dBA, Slow Response	Typical Example
8	90	Duo in small club
6	92	
4	95	Subway Train
3	97	
2	100	Very loud classical music
1.5	102	
1	105	Craig screaming at Troy about deadlines
0.5	110	
0.25 or less	115	Loudest parts at a rock concert

WARNING — The battery (battery or batteries or battery pack) shall not be exposed to excessive heat such as sunshine, fire or the like.

CAUTION — Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type.



High sound pressure. Hearing damage risk.
Do not listen at high volume levels for long periods.

Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan.

Apparatet stikprop skal tilsluttes en stikkontakt med jord, som giver forbindelse til stikproppens jord.

Apparatet må tilkoples jordet stikkontakt.

Apparaten skall anslutas till jordat uttag.



Correct disposal of this product: This symbol indicates that this product should not be disposed of with your household waste, according to the WEEE directive (2012/19/EU) and your national law. This product should be handed over to an authorized collection site for recycling waste electrical and electronic equipment (EEE). Improper handling of this type of waste could have a possible negative impact on the environment and human health due to potentially hazardous substances that are generally associated with EEE. At the same time, your cooperation in the correct disposal of this product will contribute to the effective usage of natural resources. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, waste authority, or your household waste disposal service.

Contents

- Important Safety Instructions 2
- Contents 3
- Features..... 3
- Introduction 4
- Getting Started 4
- Hookup Diagrams 5

- EM Wave Features 8
 - 1. USB-C Power Connection..... 8
 - 2. Power Switch..... 8
 - 3. Pair 8
 - 4. Mute 8
 - 5. Status LED 8
 - 6. Transmitter Mic Input..... 9
 - 7. Main Output 9
 - 8. Phones Out Jack 9
 - 9. Volume 9

- Final Thoughts10
- Care and Maintenance10

- Appendix A: Service Information 11
- Appendix B: Technical Information12
 - EM Wave Dimensions12

- Limited Warranty13

Features

- Each system includes both a transmitter and receiver**
- Ultra-compact, lightweight design**
- Digital 2.4 GHz encrypted wireless for reliable operation in any region**
- Internal rechargeable battery for up to 7 hours of use**
- One button pairing**
- Multi-color status LED**
- Use up to 6 Wave systems in the same area**
- Charge and apply updates via USB-C**
- Belt clip**
- Wave Receiver**
 - 1/8" TRS output
 - 1/8" headphone output
 - Adjustable output
- Wave LAV Transmitter**
 - 1/8" TRS input for use with the included lavalier microphone
 - Built-in electret microphone for when you need audio now
 - Adjustable Gain
 - Onboard Mute
- Wave XLR Transmitter**
 - Transmitter plugs directly into any handheld mic
 - Adjustable Gain
 - Onboard Mute
- Included accessories**
 - Deluxe carry case
 - Lavalier microphone with clip and furry windshield (Wave LAV system only)
 - 1/8" TRS to TRRS Audio Cable
 - 1/8" TRS to TRS Audio Cable
 - 2 USB-A to USB-C Cables



Introduction

EM Wave Wireless Microphone Systems takes legendary Mackie sound quality and the latest technology to make going wireless easier than ever.

Utilizing a digital 2.4GHz design, Wave offers clear, reliable performance you can count on for up to 7 hours on a single charge.

The Wave transmitter features a built-in mic (LAV system only) plus onboard Mute and Gain control, and the Wave receiver includes a headphone monitoring output and fast one-button pairing.

Built for content creation, live streaming, video production, and beyond, cut the cord with the EM Wave Wireless Microphone System. Available in a lavalier or handheld mic configurations.

How to Use This Manual:

After this introduction, a getting started guide will help you get things set up fast. The hookup diagrams show some typical setups.



This icon marks information that is critically important or unique! For your own good, read and remember them...it is a good idea to pay special attention to these areas in the Owner's Manual marked with the "VERY IMPORTANT" hand icon.



There's an illustration of a microscope, so, of course, you're going to get more detailed information when you see this little guy. There are explanations of features and practical tips listed here.



It's a good idea to pay attention to text displayed next to a note icon, as this icon draws attention to certain features and functions relating to the usage of the EM Wave Wireless Microphone Systems.

Please write the serial numbers here for future reference (i.e., insurance claims, tech support, return authorization, make dad proud, etc.)

Purchased at:

Date of purchase:

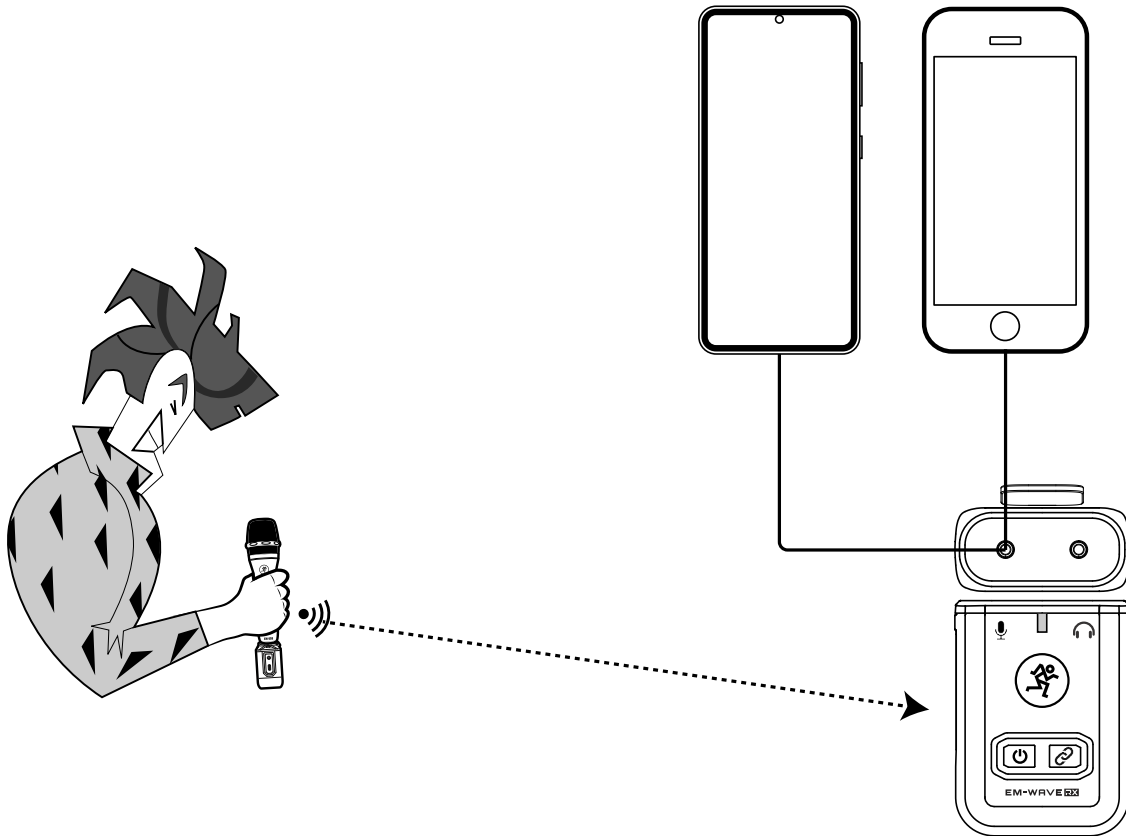
Getting Started

The following steps will help you set up EM Wave quickly.

1. Connect the 1/8" main output of the receiver to the input of a mixer, streaming or recording device.
2. Connect a mic to the transmitter's mic input.
3. Power on the receiver and transmitter. They should arrive already paired. If not, please refer to page 8 for full instructions.
4. Make sure the master volume, level and gain controls are all the way down.
5. Talk, sing, or play the instrument at the same volume as it would be during normal use... and keep it going!
6. Raise the input (transmitter) and output (receiver) levels, as well as the gain on the mixer until it clips, then turn it down a notch or two.
7. Raise the mixer's channel and main faders to a comfortable listening level.

Things to Remember:

- Never listen to loud music for prolonged periods. Please see the Safety Instructions on page 2 for information on hearing protection.
- Save the shipping boxes and packing materials! You may need them someday.
- Save your sales receipt in a safe place.



Possibly the biggest use-case scenario for utilizing EM Wave is when it's connected to a phone.

As you can see in the image above, a vocalist is preparing to use a Mackie EM-89D mic that is connected to the EM Wave XLR transmitter. The transmitter is paired with its mate, the EM Wave receiver.

An 1/8" TRSS cable is included with your purchase. Connect it between the main output of the receiver and the input of a phone. This carries the signal from the mic.

I can visualize everyone's heads spinning since not one, but TWO, phones are connected in this hookup diagram. This is only to show that it works with both Apple and Android phones... but (unfortunately) not simultaneously. The good news, though, is that up to six separate EM Wave transmitters and receivers may be used in the same environment.

Here, our creator can quickly and easily stream content live to a phone using a service like Twitch, or record it for use later for use in apps like TikTok or YouTube .

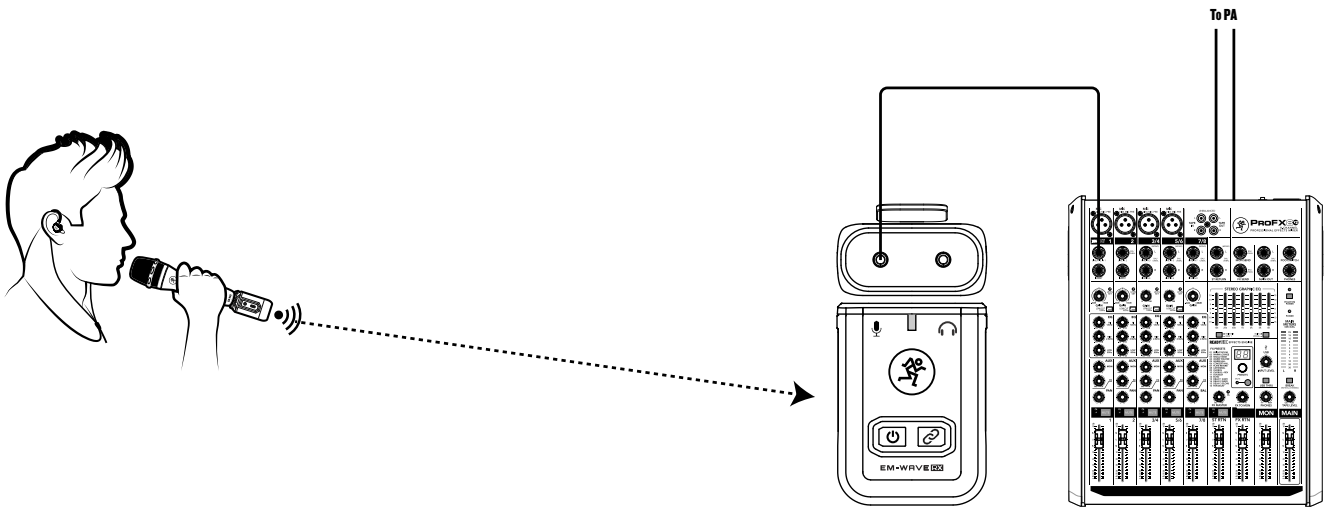
Do you need an easy way to monitor the live audio going into the DSLR? Then put on some cans and plug the headphones into the phones jack of the EM Wave receiver. Voilà! No special cable or alternate firmware needed.

Do you need to wear a mic but not look like you're wearing a mic? You can do a similar setup using the EM Wave LAV instead. You have the choice of using the professional lav mic included in the bundle, or use the mic built into the EM Wave transmitter itself. This option is especially great as a back-up solution.

Now you can create content while washing dishes, dusting, folding laundry or one of another million chores that needs to be done. But not you. You're an influencer and need your beauty sleep. The dishes, dust and clothes will all still be there tomorrow. And the day after. And the day after that one, too...

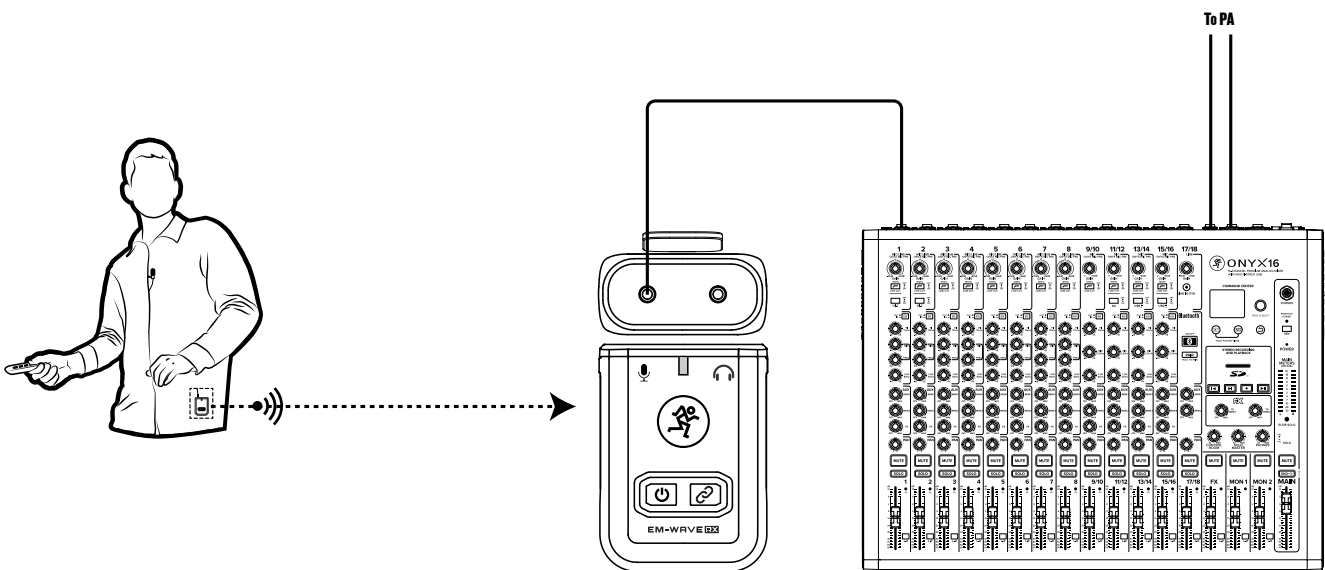
Using EM Wave with a Phone

Hookup Diagrams continued...



In this example, a Mackie EM-89D mic is connected to the EM Wave XLR transmitter. It is paired with its mate, the EM Wave receiver. An 1/8" cable is connected between the main output of the receiver and an open channel input of a mixer; a ProFX10v3 mixer, in this case. Then connect cables from the mixer's main outs to the PA system. It is the perfect setup for vocalists with great stage presence who like to roam the stage, presenters who don't want to be tethered by a cable and more!

Singer with Wireless Mic

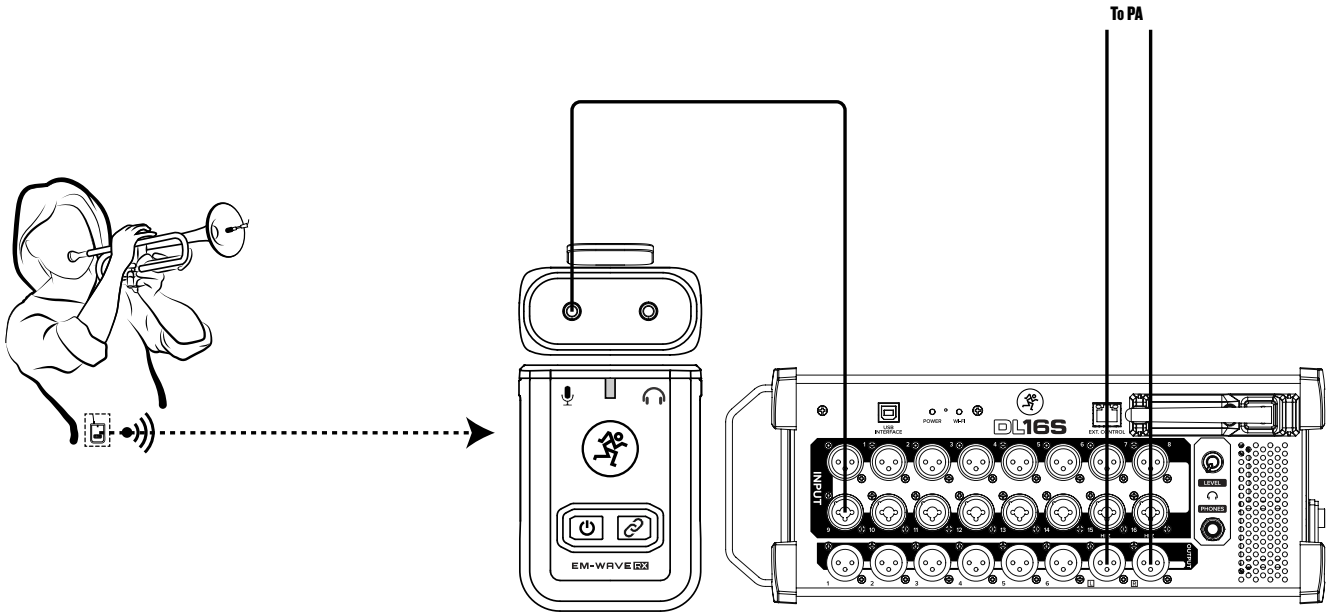


Next up is a look at the EM Wave LAV transmitter. You can see here that this is the perfect solution for a hands-free situation. For a more stealth-like presentation, the transmitter is located in the presenter's pocket while the included lav mic (with clip and furry windshield) is clipped to his shirt*. Now the presenter is free to use a remote control to switch between Power Point™ slides with ease. Or put the remote in the other pocket and break into dance. The world's your oyster!

*Don't require that amount of discretion? If not, disregard connecting the lav mic to the transmitter and simply clip the lav transmitter directly to your shirt and utilize the built-in mic.

Presenter with Lavalier Mic

Hookup Diagrams continued...

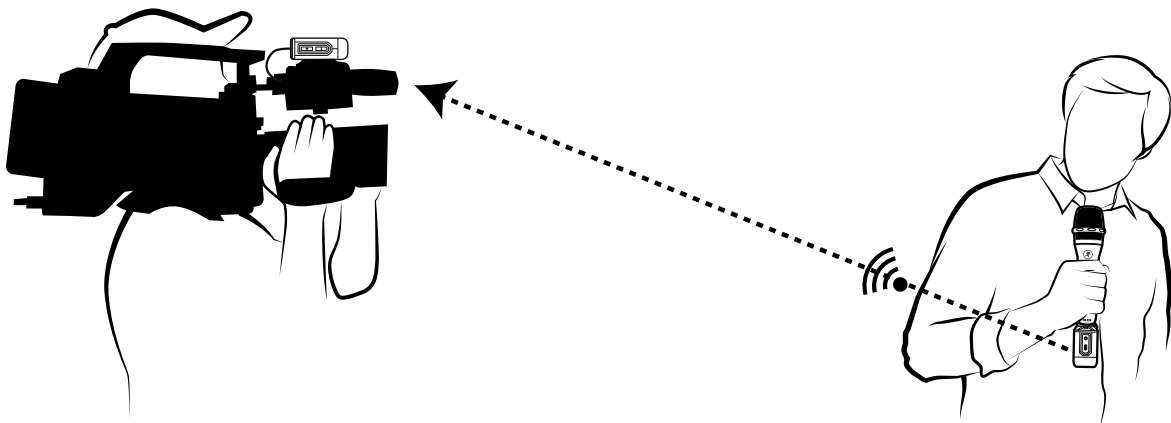


Here's another musician, but this time using the EM Wave LAV transmitter, not the XLR transmitter. It's not only the perfect solution for a hands-free situation, but a perfect solution for someone whose hands may be preoccupied, as well... like a horn player!

While the lav mic doesn't require using the included lav mic (with clip and furry windshield) to work, we highly recommend this type of setup for horn players.

Once the transmitter and receiver are paired, the receiver may sit on (or near) the mixer with a hardwired connection between the receiver and an open channel input on the mixer. Then connect cables from the mixer's main outs to the PA system.

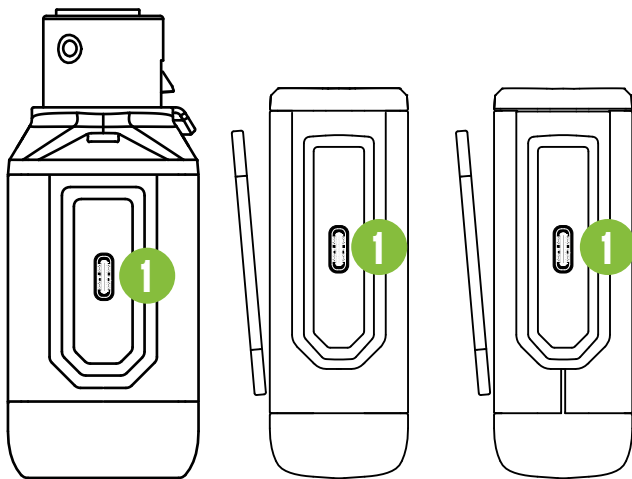
Horn Player with Lavalier Mic



Here's another example that incorporates using a Mackie EM-89D mic that's connected to the EM Wave XLR transmitter. It is paired with its mate, the EM Wave receiver. As seen above, the belt clip of the receiver may be cold-shoe mounted to a video camera, camcorder or DSLR camera. Then an 1/8" cable is connected between the main output of the receiver and the input of the video camera. This is essentially the exact same type of setup that newscasters use.

Newscaster with Wireless Mic / Cold-Shoe Mounted Camera

EM Wave Features



XLRTX

LAV TX

RX

1. USB-C Power Connection

This is a standard USB-C power connector. Connect the two USB-C sides of the detachable power cord (included in the packaging) to the transmitter and/or receiver and plug the other end of the power cord into a standard USB-A connector.



As an additional feature bonus, EM Wave may be used while charging!

2. Power Switch

The momentary power switch has multiple purposes.

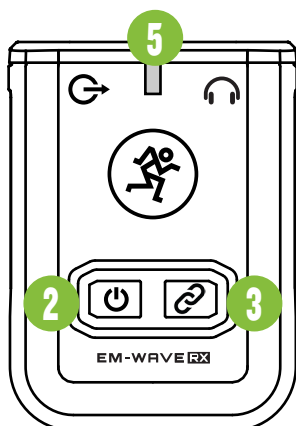
Press and hold the switch down to turn the unit on and off. When powered up, the status LED will illuminate green. If it's blinking, it's searching for its paired partner. If it has already been paired, the status LED will be solid green.

The momentary power switch has another purpose, as well. Just a quick press and release (while the unit is powered off) will reveal the remaining battery power. See 'Status LED' to the right for the data.



If this button is pressed and released quickly while the unit is powered on, nothing will happen. This is a fail-safe feature so it is not accidentally pressed in the middle of a performance. Yikes!

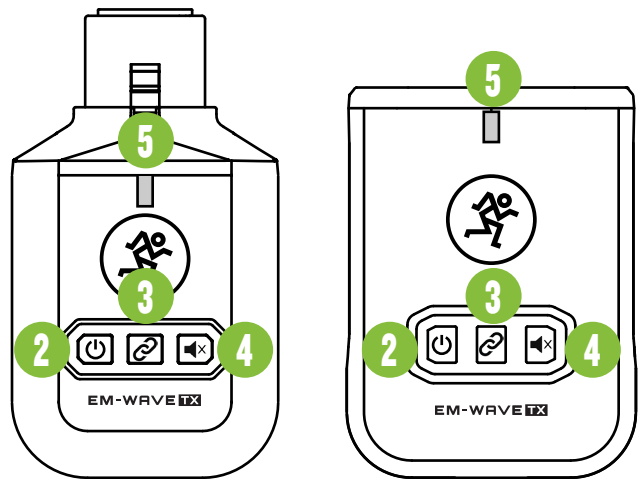
RX



3. Pair

The transmitter and receiver should arrive paired out of the box. If not – or if they have to be re-paired for some other reason – this momentary switch initiates the pairing. The status LED (see below) indicates the paired / unpaired status.

Here's how to pair: press and hold the pair button until the status LED flashes green and red. Next, press and hold the pair button again until the status LED on both illuminates solid green.



XLRTX

LAV TX

4. Mute

This momentary switch mutes and un-mutes the mic. This is an easy way to quickly kill the audio output in the event of a scenario where that needs to happen. When muted, the status LED will flash green.

5. Status LED

This LED indicates the status of the unit, including power position, battery level, device pairing and mute position.

- **Powered ON:** Status LED illuminates solid green.
- **Powered OFF:** Status LED is off.
- **Battery Level:** Checking the battery level couldn't be easier. With the power off, quickly press and release the power button. The status LED will flash anywhere from one to four times.

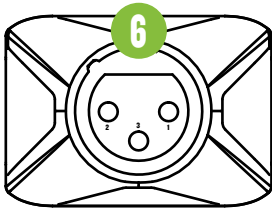
One flash – less than 25% battery power remaining
Two flashes – 25-50% battery power remaining
Three flashes – 50-75% battery power remaining
Four flashes – 75-100% battery power remaining

- **Paired:** Status LED illuminates solid green.
- **Unpaired:** Status LED flashes green and red. The steps to re-pair the units is listed above.
- **Muted:** Status LED flashes green.
- **Unmuted:** It is powered on and working as it should. The status LED will remain illuminated green.

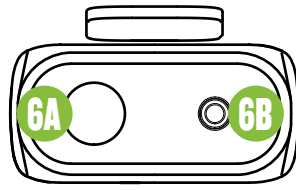
EM Wave Features continued...

6. Transmitter Mic Input

Included with your purchase is either an XLR transmitter or a lavalier transmitter.



XLRTX



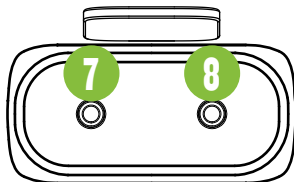
LAV TX

- **XLR Transmitter** – Here is where to connect a balanced mic using an XLR connector.
- **LAV Transmitter** – There are two ways to transmit audio via the Lav transmitter. The first is to do nothing, as there is a built-in mic (6A), ready for immediate use!

Do you have some extra time or desire a more appropriate look for video? If so, then connect the included lavalier microphone with clip and furry windshield to the 1/8" input (6B).

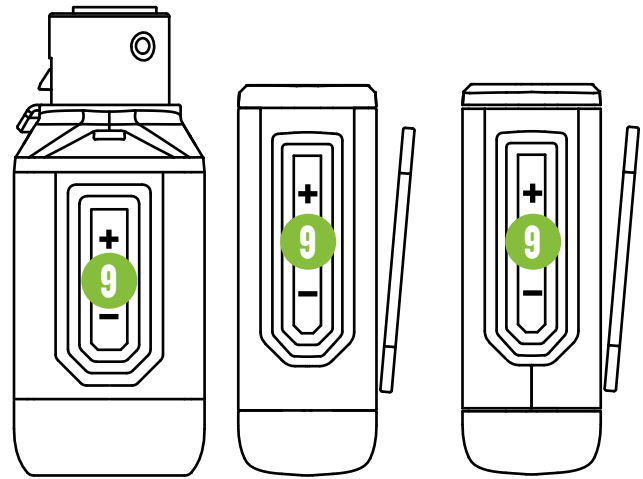
7. Main Output

This 1/8" connector supplies the output to a mixer, streaming or recording device.



RX

The receiver can simply sit on top of (or next to) the mixer or – if using a camcorder or DSLR camera – cold-shoe mount the receiver directly to it using the belt clip. And the included audio cable is the perfect length.



XLRTX

LAV TX

RX

8. Phones Out Jack

This 1/8" TRS connector supplies the output to stereo headphones.

The phones output follows standard conventions:

- Tip = Left channel
- Ring = Right channel
- Sleeve = Common ground



WARNING: The headphone amp is loud and can cause permanent hearing damage. Even intermediate levels may be painfully loud with some headphones. **BE CAREFUL!** Always turn the phones level control all the way down before connecting headphones or doing anything new that may affect the headphone volume. Then turn it up slowly as you listen carefully.

9. Volume

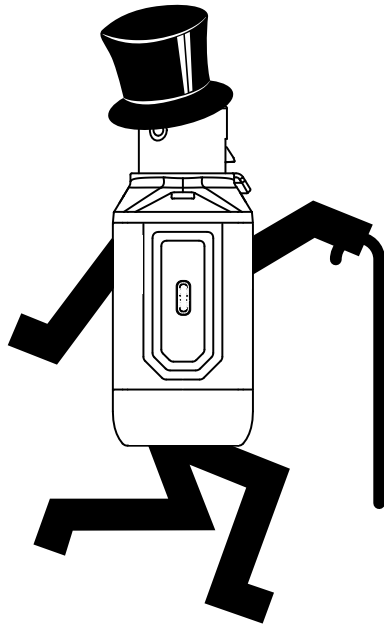
These momentary switches adjust the input level on the transmitters and adjusts the overall output level on the receiver.

The levels range from 0 dB / -12 dB / -24 dB.

Final Thoughts

We are thrilled that you decided to go with Mackie for your wireless mic system... thank you!

Microsoft™ may have (had) Clippy®, but we have the EM Wave Running Man to run you through – get it? Running Man... run you through? Don't worry, I won't give up my day job quite yet – a few tips and random thoughts that you may have missed earlier.



First up, placement. Don't extend past the operational range of 230 feet / 70 meters. By the same token, there should be a minimum of 10 feet / 3 meters between the transmitter and receiver. Additionally, allow as much line-of-sight as possible! Make sure there are minimal (or no) walls, heavy blankets, drapes or other barriers between the transmitter and receiver.

Another great tip is to make sure the batteries are fully charged prior to using them. Don't forget, though, that EM Wave may be used while it's charging!

The final – and most important – tip is to test the system PRIOR to using it. Walk around the venue, the stage, whatever environment you'll be using it in. Visualize possible problem areas and make the necessary changes to alleviate those issues.

Actually, that was the second-to-final (and second most important) tip. Number one is to have fun and enjoy!

Care and Maintenance

Your EM Wave system will provide many years of reliable service if you follow these guidelines:

- Avoid exposing them to moisture. If they are set up outdoors, be sure they are under cover if rain is expected.
- If possible, avoid exposing them to extreme cold (below freezing temperatures).
- Use a dry cloth to clean the transmitter and receiver. Only do this when the power is turned off. Avoid getting moisture into any of the openings.

Appendix A: Service Information

If you think your EM Wave has a problem, please check out the following troubleshooting tips and do your best to confirm the problem. Visit the Support section of our website (www.mackie.com/support) where you will find lots of useful information such as FAQs and other documentation. You may find the answer to the problem.

Troubleshooting

No power

- Our favorite question: Is it plugged in? Just kidding. It doesn't need to be plugged in to work. However...
- Our next favorite question: Are the power switches on? If not, try turning them on.
- Is the power / status LED illuminated? If not, they may need to be charged. If so, refer to "No sound" below.

No sound

- Is the level knob for the input source turned all the way down? Verify that all the volume controls in the system are properly adjusted. Look at the level meter to ensure that the mixer is receiving a signal.
- Is the signal source working? Make sure the connecting cables are in good repair and securely connected at both ends. Make sure the output level control on the mixing console is turned up sufficiently.
- Make sure the mixer does not have a mute on or a processor loop engaged. If you find something like this, make sure the level is turned down before disengaging the offending switch.

Poor sound

- Is it loud and distorted? Make sure that you're not overdriving a stage in the signal chain. Verify that all level controls are set properly.
- Is the connector plugged completely into the jack? Be sure all connections are secure.

Noise

- Make sure none of the signal cables are routed near AC cables, power transformers, or other EMI-inducing devices.

Other Tips for Effective Functionality

- Make sure there are minimal (or no) walls, heavy blankets, drapes or other barriers between the transmitter and receiver. Allow as much line-of-sight as possible!
- Don't extend past the operational range of 230 feet / 70 meters. By the same token, there should be a minimum of 10 feet / 3 meters between the transmitter and receiver.
- Make sure the batteries are fully charged prior to using them!

Other Issues

- Please email or call Technical Support if you are having any other issue not listed here:
 - o mackie.com/support-contact
 - o 1-800-898-3211

Repair

For warranty service, refer to the warranty information on page 13.

Non-warranty service is available at a factory-authorized service center. To locate the nearest service center, visit www.mackie.com/support/service-locator. Service for EM Wave units living outside the United States may be obtained through local dealers or distributors.

If you do not have access to our website, please call our Tech Support department at 1-800-898-3211 (normal business hours, Pacific Time), to explain the problem. They will tell you where the nearest factory-authorized service center is located in your area.

Appendix B: Technical Information

EM Wave Specifications

Wireless Technology

2.4 GHz Digital Wireless with 128-bit encryption

Operational Range

70M LOS

Dynamic Range

>105 dB

Battery Technology

Internal rechargeable LiON (or similar)

Battery Life

Seven hours of use before charging required

Analog Output Level (Base-X)

Adjustable pad: 0 dB / -12 dB / -24 dB

Transmitter Pairing

One-button

Power Requirements

5 VDC 2A

Physical Properties

XLR Transmitter

Height:	3.3 in / 84 mm
Width:	1.6 in / 41 mm
Depth:	1.0 in / 25 mm
Weight:	0.09 lb / 0.04 kg

Lav Transmitter and Receiver

Height:	2.0 in / 51 mm
Width:	1.5 in / 38 mm
Depth:	1.1 in / 28 mm
Weight:	0.07 lb / 0.03 kg

Disclaimer

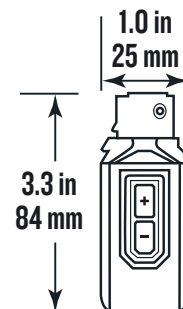
Since we are always striving to make our products better by incorporating new and improved materials, components, and manufacturing methods, we reserve the right to change these specifications at any time without notice.

The "Running Man" figure is a registered trademark of LOUD Audio, LLC.

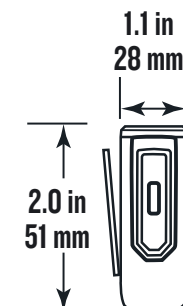
All other brand names mentioned are trademarks or registered trademarks of their respective holders, and are hereby acknowledged.

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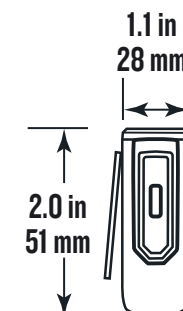
EM Wave XLR Dimensions



EM Wave LAV Dimensions



EM Wave Receiver Dimensions



Please keep your sales receipt in a safe place.

This Limited Product Warranty ("Product Warranty") is provided by LOUD Audio, LLC ("LOUD") and is applicable to products purchased in the United States or Canada through a LOUD-authorized reseller or dealer. The Product Warranty will not extend to anyone other than the original purchaser of the product (hereinafter, "Customer," "you" or "your").

For products purchased outside the U.S. or Canada, please visit www.mackie.com to find contact information for your local distributor, and information on any warranty coverage provided by the distributor in your local market.

LOUD warrants to Customer that the product will be free from defects in materials and workmanship under normal use during the Warranty Period. If the product fails to conform to the warranty then LOUD or its authorized service representative will at its option, either repair or replace any such nonconforming product, provided that Customer gives notice of the noncompliance within the Warranty Period to the Company at: www.mackie.com or by calling LOUD technical support at 1.800.898.3211 (toll-free in the U.S. and Canada) during normal business hours Pacific Time, excluding weekends or LOUD holidays. Please retain the original dated sales receipt as evidence of the date of purchase. You will need it to obtain any warranty service.

For full terms and conditions, as well as the specific duration of the Warranty for this product, please visit www.mackie.com.

The Product Warranty, together with your invoice or receipt, and the terms and conditions located at www.mackie.com constitutes the entire agreement, and supersedes any and all prior agreements between LOUD and Customer related to the subject matter hereof. No amendment, modification or waiver of any of the provisions of this Product Warranty will be valid unless set forth in a written instrument signed by the party to be bound thereby.

Need help with the EM Wave Microphone System?

- Visit www.mackie.com/support to find: FAQs, manuals, addendums, and other documents.
- Email us at: www.mackie.com/support-contact
- Telephone 1-800-898-3211 to speak with one of our splendid technical support chaps (Monday through Friday, normal business hours, Pacific Time).



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