



**Digital UHF Wireless Microphone System
Model XDR955 Series
Users Guide**

Includes easy setup instructions for single and multi-system operation

- 24-bit Digital Conversion
- No Companders
- Q-DiversityPLUS™ (anti-jam) Technology
- Extended Operating Range
- Reliable, Wired Sound and Performance
- Multi-channel Operation

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Introduction

Line 6 is proud to now include X2 Digital Wireless Systems as part of our extensive line of innovative products!

Created specifically for performing vocalists and musicians who demand to be untethered without compromising their sound, the XDR955 Series 24-bit digital wireless system delivers your exact performance with the sound and feel of a direct wire connection all with extended range and added protection from outside RF interference.

X2's proprietary digital technology provides superior fidelity while the XDR-955's rackmount receiver houses a micro-processor that selects the digital data stream from among the four internal receivers to eliminate dropouts and interference including DTV and other digital signal sources. You'll enjoy the sound and performance of a direct wire connection free from compander ICs (and associated 'pumping and breathing') that squash your tone, as well as other problems associated with analog wireless technology.

Operating the system is unlike any wireless you've tried before. Simply grab the microphone or connect the transmitter to the source via the 1/8" threaded-collar locking connector, then connect the rackmount receiver to your amplifier or mixer. Finally, power up making sure the transmitter and receiver are set to the same channel. That's it. You're ready to go! The XDR-955 is free of the typical setup complications of other systems meaning you're up and running in the time it would take to connect a cable. For greater operating range, attach the included 1/2 wave antenna to the BNC connectors on the back panel of the receiver. And for even greater flexibility, the system ships complete with a front-mount antenna kit that allows you to bring the BNC connectors and antenna out to the front of the receiver unit.

About the XDR955 Series Digital Wireless System

All of this sound and performance is provided to you with an incredible feature set including:

- 24-bit digital converters deliver your exact performance without the use of companders
- >118 dB dynamic range to capture your most expressive performances
- 2009 Compliant means no FCC or DTV concerns
- Q-DiversityPLUS™ dual-frequency transmission eliminates dropouts, multipathing and interference
- Five user-selectable channels (all five are fully compatible for simultaneous use)
- Full bandwidth frequency response 10 Hz - 20 kHz
- Balanced XLR and unbalanced 1/4" TRS outputs
- Real-time LEDs display critical performance indicators including: operating channel, RF status, link status, audio level, diversity mode and transmitter battery life

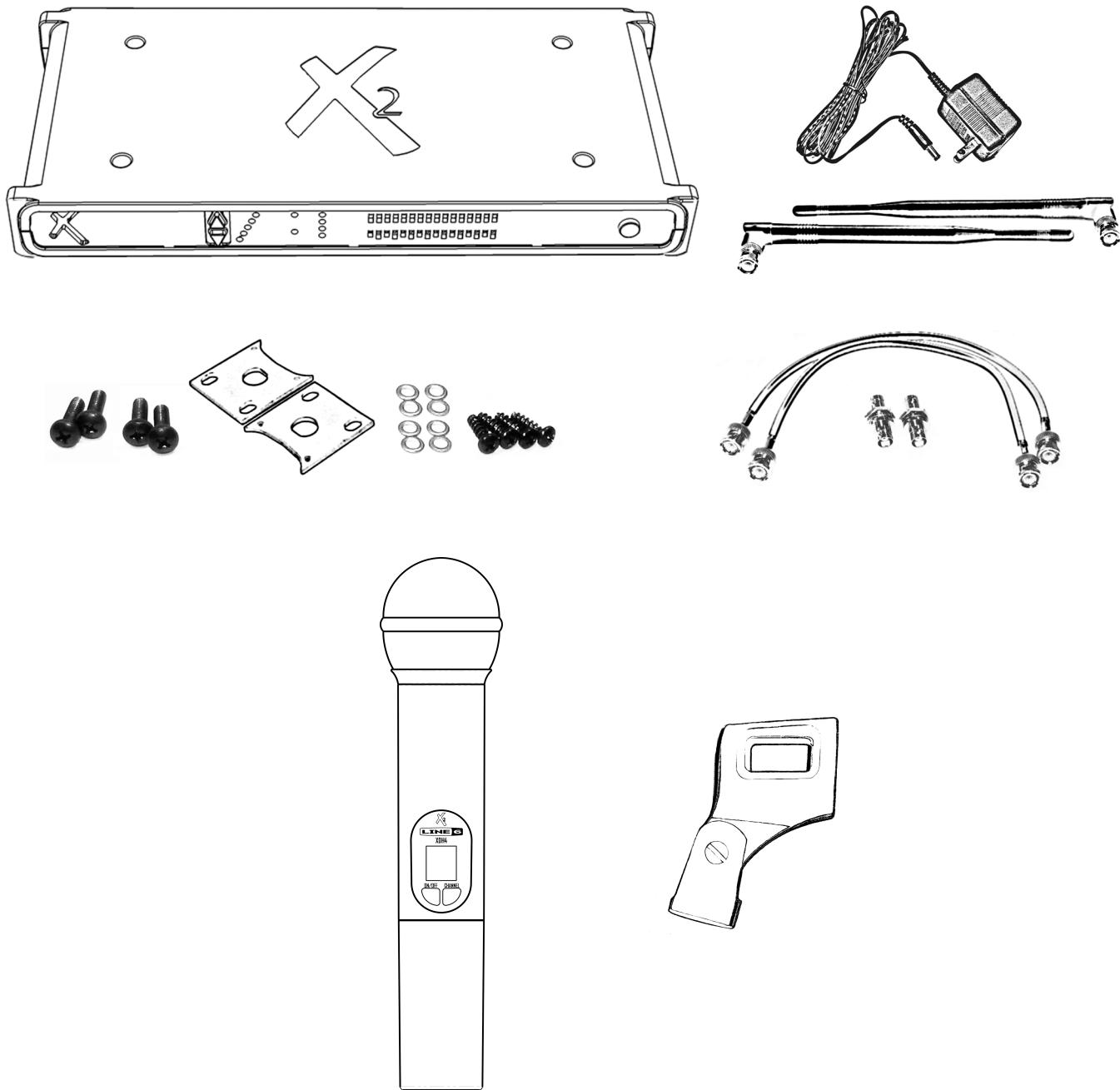
With the XDR955 Series Digital UHF Wireless Microphone System you'll have the freedom and sound to deliver your most expressive performance every time without any hassles or complicated setup procedures.

Thank you for choosing X2!

We have designed this product to give you reliable operation for many years to come. Over 10 years of accumulated expertise in the design and manufacture of high-quality digital wireless systems have made X2 the leading company in this field. To familiarize you with your new digital wireless system, we suggest that you read through this entire operation manual.

System Components

- (1) XDR4 Digital UHF receiver
- (1) XAC4 (9V DC 500mA power supply for XDR4)
- (2) 1/2 wave antenna
- (1) Rackmounting kit (includes rack ears and the necessary mounting hardware (see installation instructions on page 5))
- (1) Front-mount antenna kit (includes necessary hardware - see front-mount antenna installation instructions on page 5)
- (1) XDH4 Digital Wireless Microphone
- (1) Microphone clip



Receiver Controls & Front Panel

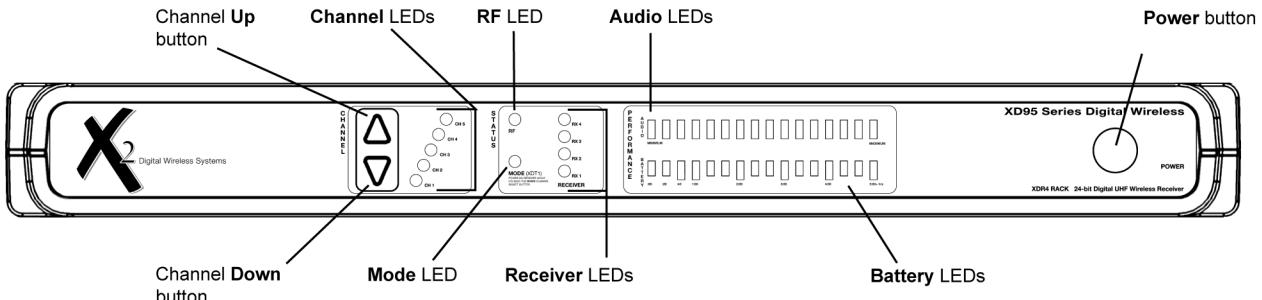


FIGURE 1

Power Button

Press once to turn the unit on. To power the unit off, press and hold until the "X2" logo begins to cycle letting you know that the unit will now turn off.

Channel Up & Down Buttons

Press the UP button to select the next channel. Press the DOWN button to select the previous channel. Button sequence does not wrap around. For example, once CH5 is selected you must press the DOWN button four times to reach CH1.

Channel LEDs

A blue LED will light indicating the currently selected channel of operation.

RF LED

A red LED will light indicating that an RF signal is present on the currently selected channel.

Mode LED

A green LED will light indicating XDR mode (factory) and ensures that your system is operating at full bandwidth and providing Q-DiversityPLUS interference protection. A blue LED will light when the XDH4 digital wireless microphone is in use. A red LED will light indicating that the receiver is currently operating in XDS mode allowing operation with original XDT1 transmitters from the XDS95 'stomp-box' system. NOTE: While in this mode, the frequency response will be that of the XDS95 'stomp-box' system (10 Hz - 12 kHz). NOTE: Battery telemetry will be disabled when using XDT1 transmitters.

Changing Modes

To change the operating mode: power the unit off, press and hold the Channel DOWN button and power up. The unit will remain in the newly chosen and displayed mode until you repeat this process.

Receiver LEDs

A green LED will light indicating that the unit is receiving data on one of four internal receivers. The unit houses four separate internal receivers, two of which include internal antenna meaning that the system will operate even without external antenna attached. NOTE: Range may be adversely affected without attaching the supplied 1/2 wave antenna. RX 1 and 4 represent the lower frequency while RX 2 and 3 represent the upper frequency. Please see Q-DiversityPLUS description on page 16.

Audio LEDs

Blue LEDs will light indicating the audio signal level. There is no need for a CLIP indicator as the system has greater than 118 dB dynamic range and can accommodate input/output signals up to ~6V peak-to-peak.

Battery LEDs

Green LEDs will light indicating remaining battery life in the transmitter. Each tall bar represents one-hour segments. Each short bar represents 20 minute segments. The first three LEDs will glow red once the transmitter battery life falls below one hour. NOTE: Battery telemetry is only available with XDT4 transmitters

Receiver Connections

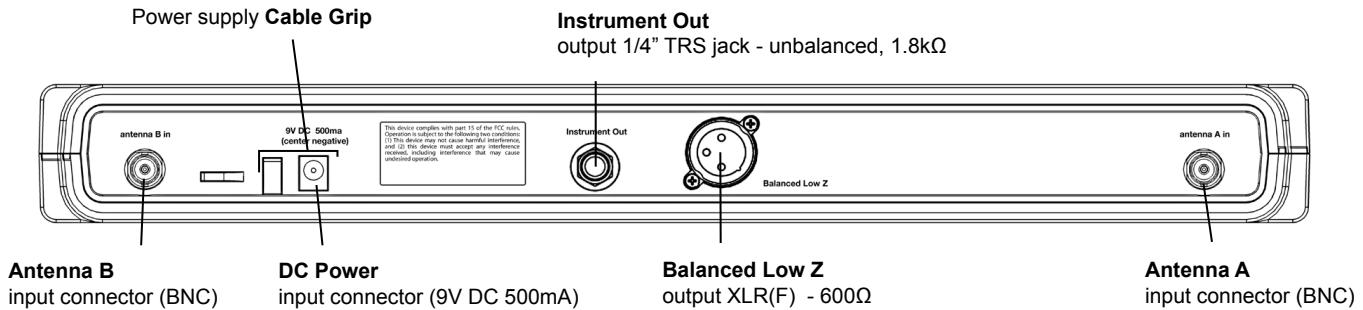


FIGURE 2

Antenna A & B Input Connector (BNC)

Diversity antenna inputs A and B. For correct operation connect the supplied detachable antenna by pressing on the BNC connector and twisting clockwise for ~1/2 turn. **NOTE:** Antenna inputs ARE NOT DC biased.

Cable Grip

Thread the power supply cable into the CABLE GRIP to secure the connection as shown in figure 3.

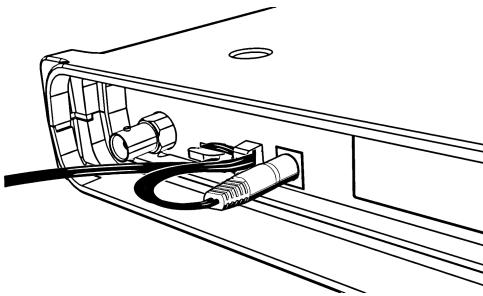


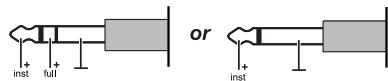
FIGURE 3

DC Power Input

DC socket for connection of power supply, 9V DC 500 mA (supplied).



Instrument Output Jack



This 1/4" unbalanced TRS output jack (1.8 kΩ) is voiced at the tip for instrument applications (gentle high-frequency roll off at 8 kHz approximates sound of a 15' cable), and full bandwidth (10 Hz to 20 kHz) on the ring. Great for 'tuner' out or dual amp setups.

Balanced Low Z

Balanced XLR, 600Ω, full-bandwidth output (10 Hz to 20 kHz).



Antenna Installation

How to Connect the Supplied Antenna

Connect the supplied detachable antennas to the Antenna A and B inputs located on the back panel of the receiver and twist clockwise for ~1/2 turn as shown in figure 4. For best results, tilt antennas outwards in a V shape to be 90 degrees in relationship to each other.

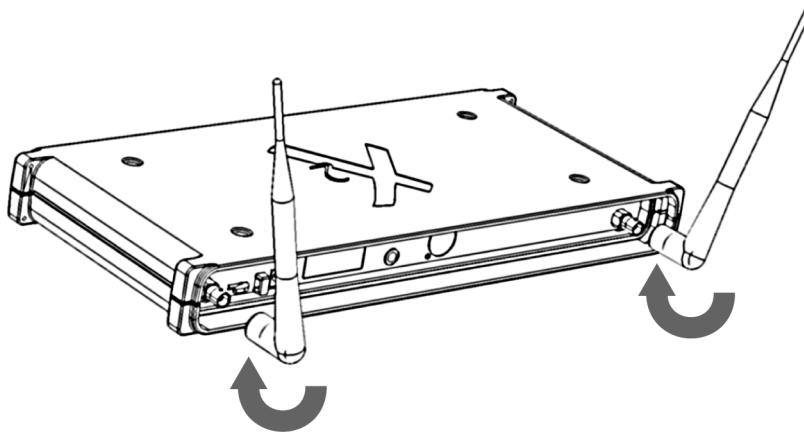


FIGURE 4

Preparing Rack Ears for Installation

Connect the supplied BNC connector to each rack ear prior to installing the rack ears to the chassis. Make certain that the nut goes on the back side of the rack ear as shown in figure 5.

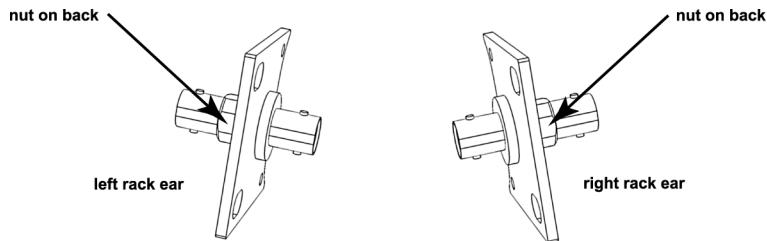


FIGURE 5

Rack Ear Installation

Only mount rack ears onto the chassis with supplied 1/4" hex screw and washers making certain to place a washer on each side of the rack ear as shown in figure 6.

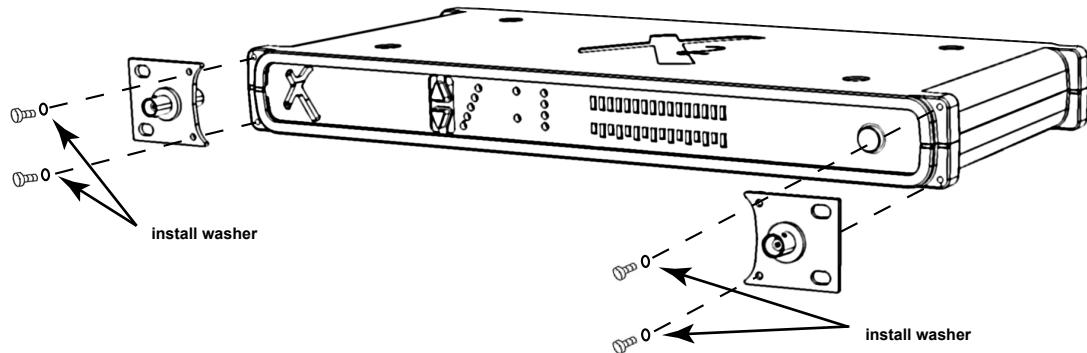
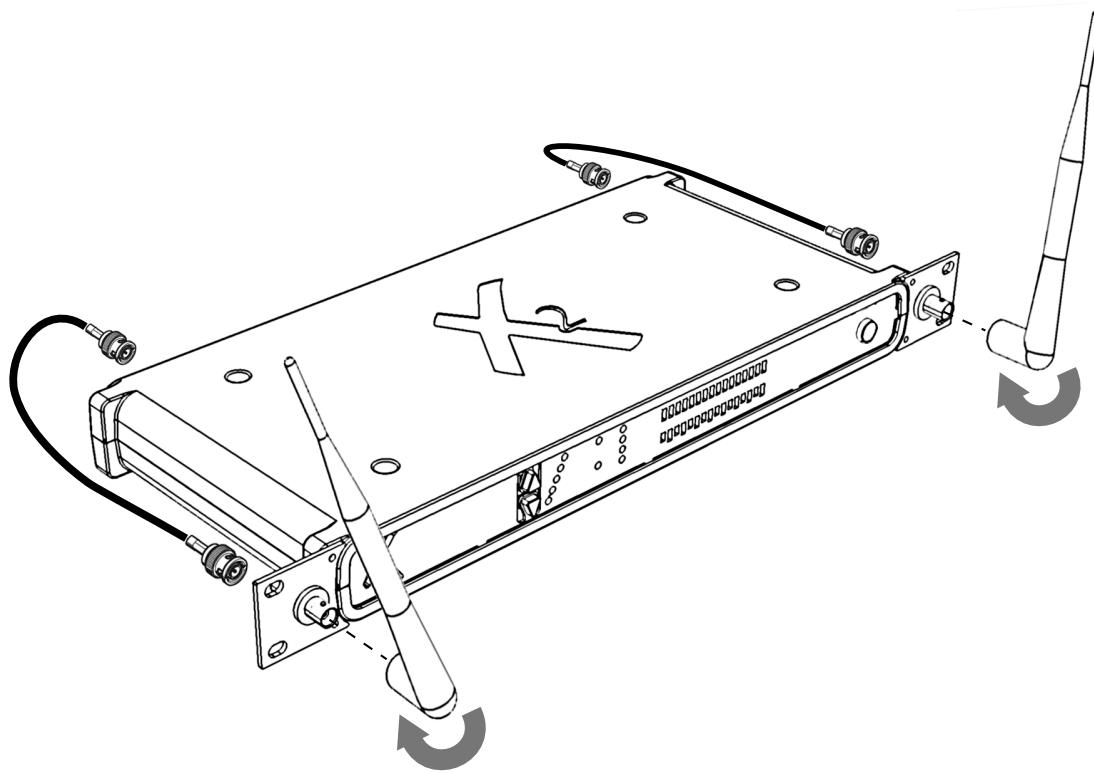


FIGURE 6

Front-mount Antenna Installation

Connect the supplied BNC patch cables to the Antenna A and B inputs located on the back panel of the receiver and twist clockwise for ~1/2 turn then connect the other end to the BNC connector located on the back side of each rack ear and twist clockwise for ~1/2 turn. Finally, connect the 1/2 wave antenna by pressing on the BNC connector on the front side of the rack ear and twisting clockwise for ~1/2 turn as shown in figure 7. For best results, tilt antennas outwards in a V shape to be 90 degrees in relationship to each other.

FIGURE 7



Preparing the Handheld Transmitter for Use

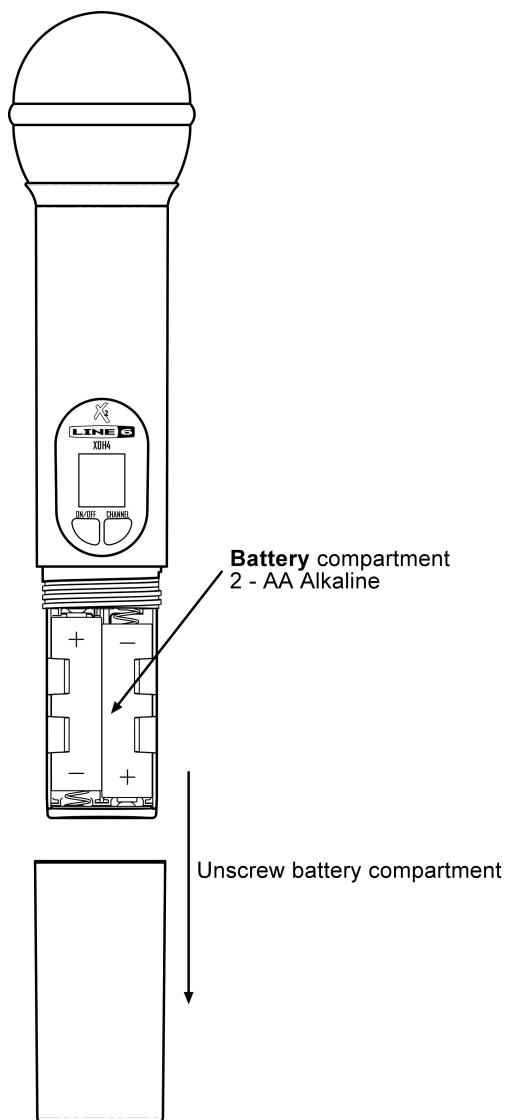


FIGURE 8

Battery Installation

As shown in figure 8, remove battery cover by turning counter-clockwise and pulling down. Install the two supplied AA alkaline batteries observing correct polarity. Then close the battery compartment by turning clockwise until secure.

NOTE: Do not over tighten.

XDH4 Handheld Transmitter Controls & Operation

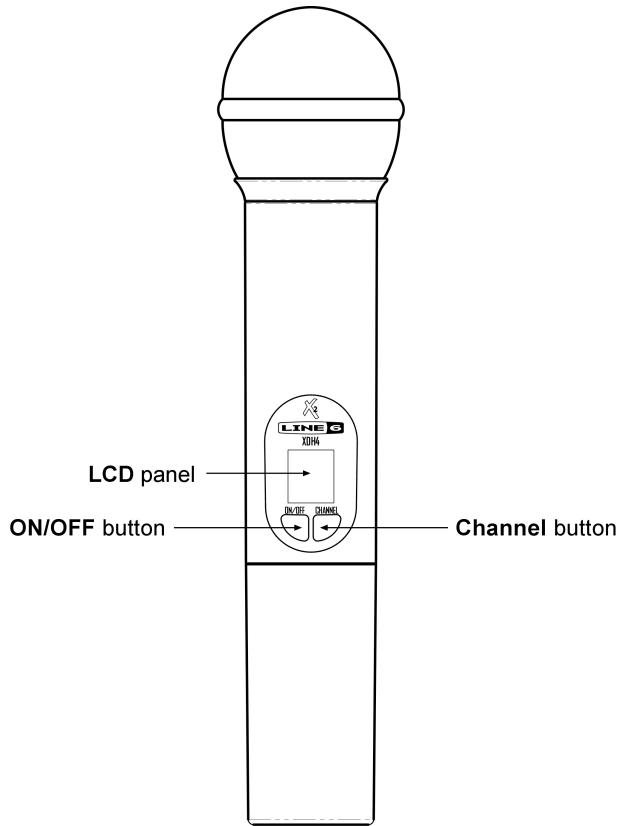


FIGURE 9

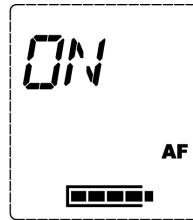


FIGURE 10

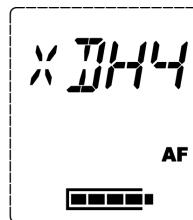


FIGURE 11

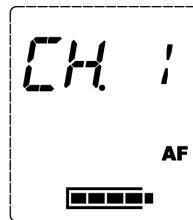


FIGURE 12

On/Off Button and Operation

Figure 9 shows the XDH4's control bezel where the On/Off button is located at the lower left corner.

The XDH4 comes from the factory in an "Unlocked" state (see Safety Switch section on P. 9 for Locking the XDH4).

Press the ON/OFF button to turn the unit "ON".

The LCD backlight will glow green and briefly flash "ON" then displays "XDH4" for 3 seconds (as shown in Figures 10 and 11).

The screen then switches to the normal operational view as shown in Figure 12 displaying the current Channel in use, the Audio Frequency emblem (AF), and the Battery Power meter. After 2 seconds of displaying this screen the backlight will then go out.

To power the XDH4 "OFF" press and hold the ON/OFF button for 2 seconds.

Note display shown in Figure 14.

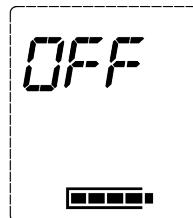


Figure 13

Input Signal Meter

Once powered on, the XDH4's 5 segment Input Signal Meter begins registering the audio signals coming into it.

Figure 14 shows the display at maximum input signal strength

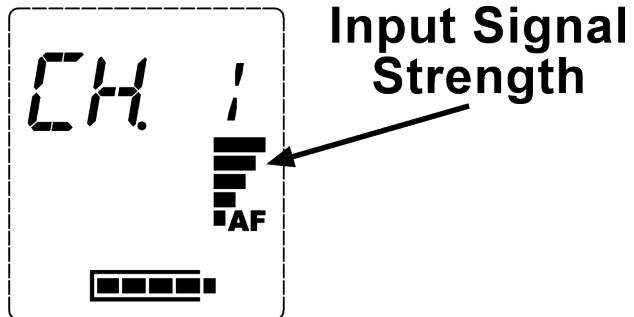


FIGURE 14

Channel Button

Use for selecting one of the 5 channels.

NOTE: The XDH4 must be “unlocked” to perform these following steps. Please see the Safety Switch section below.

Press the “Channel” button once to activate Channel Select mode. The LCD Backlight will wake up and glow green for 3 seconds as the unit waits for a channel selection to be made. To select a new channel simply continue to press the Channel Button to cycle through the 5 available channels. When a Channel gets changed the XDH4 automatically mutes the input and RF signals being sent to the XDR4 receiver. After you've made your channel selection the settings will be stored automatically to the XDH4's internal flash memory after 2 seconds of inactivity and the audio input and RF signal will be un-muted. Figure 15 shows an example of selecting Channel 5.

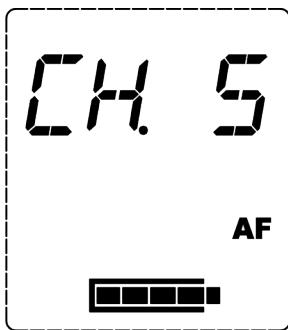


FIGURE 15

If no action is taken upon entering the Channel Select mode for 3 seconds the LCD backlight will shut off and the unit will revert back to its normal operational mode as previously shown in Figure 12.

Safety Switch

The Safety Switch comes from the factory in an “Unlocked” position. This allows you to make any necessary channel adjustments for your initial setup. After saving your channel adjustments it’s advised that you set the Safety Switch to its “Lock” position.

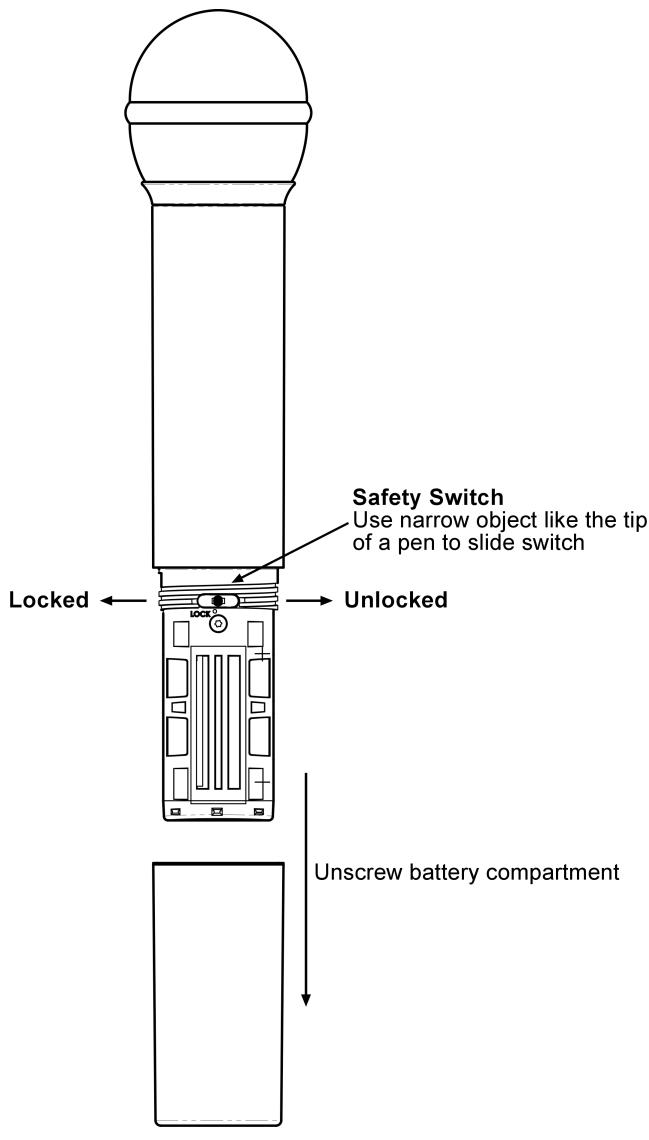
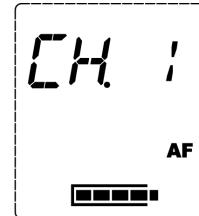
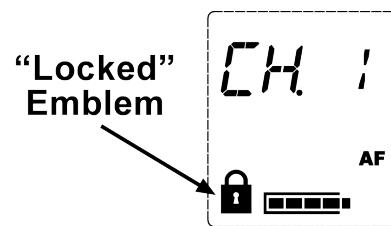


FIGURE 16



Main View
Unlocked

FIGURE 17



Main View
Locked

FIGURE 18

The Safety Switch is located behind the battery compartment and just above the XDH4’s serial number and FCC compliance stickers. It’s recessed to protect against accidental movement which could lead to accidental shut off or channel switching during a performance.

When “Unlocked”, the Safety Switch will be set to the Right position and there will be no Lock emblem shown on the lower left corner of the LCD screen. In this mode you are able to make changes to your channel settings and save them.

When you’ve completed saving your channel settings use a narrow object like the tip of a pen to insert into the Safety Switch slot and slide the switch to the Left to its “Lock” position. This will prevent the front panel controls from being able to change any settings or shut the XDH4 off accidentally.

The LCD display will now show the Lock icon in the lower left corner. If either the ON/OFF or Channel buttons are pressed while in Lock mode the LCD backlight display will glow green and the word “LOCK” will flash across the screen.

To turn the unit off when the XDH4 is in Lock mode it’s necessary to unscrew the battery cover and slide the Safety Switch back to its “Unlocked” position to the right.

Once unlocked, press and hold the ON/OFF button for 2 seconds to turn the unit off.

Troubleshooting

Issue	Cause	See Solution...
No sound.	System not turned on. Source malfunction. Improper connection or improper channel selection. Expired battery.	Power, Signal Source (ensure the blue LED is lit on the receiver indicating the XDH4 is in use), Cables or RF
Intermittent sound or distorted sound.	Source malfunction. Improper connection. Multiple transmitters are set to the same operating channel. Transmitter has gone out of range. Transmitting through metal wall. Unknown source of RF in local area. Safety Switch not set to "Lock" mode allowing channels to get changed which creates momentary signal mutes to the XDR4 Receiver.	Signal Source (ensure the blue LED is lit on the receiver indicating the XDH4 is in use), Cables or RF, Safety Switch
Lack of range.	Improper or lack of antenna connection. Multiple transmitters are set to the same operating channel. Unknown source of RF in local area.	RF

Power

Make certain that the transmitter and receiver are receiving sufficient power. The receiver requires 9V DC at 500mA. The XDH4 hand-held transmitter requires 3V DC via two alkaline AA batteries. Check the battery status indicator on the transmitter and replace if necessary.

Signal Source

Make certain that the source is operating as desired by checking source power, signal levels and connections.

Cables

Make certain that all connections and cables are in working order.

RF

Turn all known transmitters off. Check to see if the red RF LED on the receiver's front panel is lit. If it is not lit, then the receiver is not detecting the presence of RF signal on the currently selected channel. If it is lit, then the receiver is detecting the presence of unknown RF signal. Check to see if any of the green Receiver LEDs are lit. If any are lit, then the receiver is detecting the presence of another X2 transmitter set to the same channel. Locate this unit and either turn it off or switch channels. If none of the green Receiver LEDs are lit, then the receiver is detecting confirmed RF signal from a source other than an X2 transmitter. Change the channel and repeat these steps to locate a clear channel.

Optimizing Performance

RF Interference

An X2 Digital transmission is not susceptible to interference in the traditional ‘analog’ wireless sense. An X2 receiver will only pass digital data that originated from an X2 transmitter set to the same operating channel. If this transmitter has a custom encryption scheme, a standard X2 receiver will no longer be able to recognize or reproduce the signal. RF interference for X2 systems will only become noticeable when a system’s range has been adversely affected or when the red RF indicator is lit without the desired transmitter in use. In most cases, the system will still operate reliably with a reduced performance range even when RF interference is present on your channel. Due to the anti-interference/anti-jamming technology available with the XDR-95 system, the chance of having a performance negatively impacted by RF interference is greatly reduced.

Increasing Range

Transmission range depends to a large extent on location and can vary the minimum and maximum performance range. There should be a “free line of sight” between transmitters and receiving antennas. For best results, maintain a line of sight between transmitter and receiver antennas. Move receiver antennas away from metal objects or other sources of RF interference (such as CD players, computers, digital effects, network switches, network cables, etc.). We recommend that you employ remote antennas when the receiver position is not the best antenna position for optimum reception. For multiple systems, make certain that each system is operating on its own separate channel.

Multi-channel Operation

For multi-channel operation, it is recommended that you only use channels that are not in use by other performers. Before powering on additional transmitters, we recommend performing a quick RF scan. This is done at the receiver unit by selecting unused channels and checking for the presence of RF energy via the RF indicator on the front panel. If the channel is open, power on the desired transmitter and set it to the open channel. NOTE: When operating more than one system, maintain a minimum distance of 3 ft. from all other receiving antenna that are connected to systems other than your system.

Specifications

Transmission Format:	X2 proprietary digital audio transmission
A/D – D/A Conversion:	24-bit Delta Sigma, 128 times over sampling
Frequency Response:	10 Hz - 20 kHz
Audio Dynamic Range:	>118 dB
Distortion:	0.03% THD
RF Carrier Frequency:	902 MHz to 928 MHz, FSK, dual frequency transmission
Selectable Frequencies:	Five
RF Output Power:	15mw
Audio Output Level:	Unity gain with transmitter input
Polarity:	Positive voltage at input yields positive voltage at output
Transmission Range:	~200 feet line-of-sight (may vary due to local conditions)
FCC Approval:	Part 15 approved, no user-license required
Operating Temp. Range:	-18° to +57° C (0° to +135° F)

XDR4 Receiver Specifications

Output:	2.12V RMS (Unbalanced: 1.8kΩ)
Connectors:	1/4" Unbalanced TRS output 1.8kΩ impedance, tip= instrument voicing, ring= full bandwidth, sleeve= ground, XLR Balanced 600Ω
LED Display:	Power On, RF, Channel, Operating Mode, Diversity, Battery Life, Audio Level Meter
Controls:	Power On/Off, Channel UP and Down
Dimensions (HxWxD):	16.2 x 1.75 x 7.5" (41.14 x 4.44 x 19.05 cm)
Power Requirements:	9V DC 500mA via included AC/DC adapter
Weight:	2.25 lbs. with rack hardware installed
Housing:	Metal Chassis

XDH4 Handheld Specifications

RF Output Power:	10mW
Audio Dynamic Range:	115 dB
Microphone Element:	Dynamic, unidirectional
Controls:	Power On/Off, Channel Select
LCD Display:	Channel or Text, Power Level, Battery Life, Audio Level Meter, Lock Status, Mute Status
Dimensions:	6.25 x 1.5 in.
Power Requirements:	3V DC Approximately 10+ hrs w/ 2x AA alkaline batteries included
Weight:	6.56 oz (with 2x AA batteries installed)

Architect's and Engineer's Specifications

The wireless system shall utilize digital conversion and operate in the UHF band between 902 MHz and 928 MHz for operation in North and South America. The system shall transmit a digital representation of the audio signal over two separate RF frequencies that include a unique digital code sequence that identifies the transmission to the receiver thus locking out all other sources of interference without the need of squelch circuitry. The system shall include the option of changing the compatible preset operating frequencies enabling up to 5 systems to operate simultaneously in the same location without interfering with one another.

Bodypack transmitters shall be powered by a single 9 volt battery and shall have a power on/off button, a channel select button, and an LED display automatically indicating power status, battery strength, operating channel and audio level. Handheld transmitters shall be powered by two AA batteries and shall have a power/set button, a select button, as well as a user programmable menu-driven backlit LCD showing channel, audio level, RF power mode, control lock status, name, and battery strength. Available transmitters shall include: a body pack for use with electric guitars, basses and other electric instruments, and lavalier and headset microphones for vocals, and a handheld microphone for vocals. Transmitters shall have a DC/DC converter to ensure consistent performance, even if battery voltages change.

The receiver shall have two channel select buttons, one for 'next' channel and one for 'previous' channel. The receiver LED display shall indicate the current operating channel, RF present, Diversity status, Audio Level, remaining Battery Level in the transmitter with a resolution to within 20 minute increments being preferred. The system shall use dual frequency transmission technology such as Q-diversityPLUS to maximize RF performance and to eliminate interference, audio artifacts and unwanted noise. The receiver shall include four Receiver LEDs (one for each internal receiver), automatically indicating the operating status of each internal receiver. The system shall be capable of handling an input and output signal of up to 6 volts peak-to-peak without the use of compander ICs.

The system shall be the X2 XDR-95 Digital Wireless System. **X2 Digital Wireless Systems**

Q-DiversityPLUS™ Frequency Diversity Technology

What is it?

A dual-frequency broadcast system that maximizes data isolation from undesired interference. It can also be thought of as two completely separate 'true-diversity' systems operating in tandem. RX 1 and 4 work together to receive the lower frequency while RX 2 and 3 work together to receive the upper frequency.

What does it do?

Allows XDR95 to provide reliable performance under adverse RF conditions.

Do other types of technology use dual-frequency broadcast?

Multiple frequency broadcasts are not unique. OFDM would be an example of splitting up data over multiple frequencies. However, X2's proprietary Q-DiversityPLUS is unique for real-time audio applications.

Why do we need it?

Wireless systems are subject to increased interference due to known and unknown sources of RF interference, including DTV, cell phones, blackberrys and networking devices. XDR95 was designed to address the needs of professional wireless users requiring consistent reliable performance even in adverse conditions without any loss to sound quality.

How does it work?

In the transmitter, a proprietary digital data stream that includes a digital representation of the audio signal is split and modulated on two separate RF carrier frequencies. The receiver contains a quadraplex of separate receiver sections that work simultaneously to receive the two RF signals. Two receiver sections are directly connected to two internal antennae, while two others are fed RF signals via two chassis mounted BNC connectors. These sections work simultaneously to receive the two RF signals that contain the transmitted digital data.

Why is it better?

Q-DiversityPLUS allows the XDR95 to exceed other wireless systems in terms of freedom from negative audio side-effects of increased interference and longevity of performance in the field.

