

# **U100 Series**

## **Camera-mount UHF Wireless Microphone Systems**

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***ATW-U101*** Body-pack Transmitter System

***ATW-U102*** Plug-on Transmitter System

***Installation and Operation***



**audio·technica®**

# U100 Series Camera-mount UHF Wireless Microphone Systems

## Installation and Operation

This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

This device complies with INDUSTRY CANADA R.S.S. 210, en conformité avec IC: RSS-210/CNR210. Operation is subject to the following conditions: 1) This device may not cause harmful interference and 2) this device must accept any interference received, including interference which may cause undesired operation.

### **Notice to individuals with implanted cardiac pacemakers or AICD devices:**

Any source of RF (radio frequency) energy *may* interfere with normal functioning of the implanted device. All wireless microphones have low-power transmitters (less than 0.05 watts output) which are unlikely to cause difficulty, especially if they are at least a few inches away. However, since a "body-pack" mic transmitter typically is placed against the body, we suggest attaching it at the belt, rather than in a shirt pocket where it may be immediately adjacent to the medical device. Note also that *any medical-device disruption will cease when the RF transmitting source is turned off*. Please contact your physician or medical-device provider if you have any questions, or experience any problems with the use of this or any other RF equipment.

**CAUTION!** The circuits inside the receiver and transmitter have been precisely adjusted for optimum performance and compliance with federal regulations. Do not attempt to open the receiver or transmitter. To do so will void the warranty, and may cause improper operation.



**Warning:** To prevent fire or shock hazard, do not expose this appliance to rain or moisture.  
**Attention:** Pour prévenir feu ou choc électrique, ne pas exposer l'appareil à la pluie ou à l'humidité.

### **Introduction**

Thank you for choosing an Audio-Technica professional wireless system. You have joined thousands of other satisfied customers who have chosen our products because of their quality, performance and reliability. This Audio-Technica wireless system is the successful result of years of design and manufacturing experience.

The U100 systems are designed primarily for use in audio-for-video applications, with the receiver mounted on a camera and connected to the camera's audio input. U100 systems provide a choice of 100 PLL-synthesized UHF frequencies. Each system includes a receiver and either a body-pack or plug-on transmitter:

<b>System</b>	<b>Receiver</b>	<b>Transmitter</b>
ATW-U101	ATW-R100	ATW-T101 Body-pack
ATW-U102	ATW-R100	ATW-T102 Plug-on

The ATW-R100 receiver features true diversity reception. Two antennas feed two completely independent RF sections on the same frequency; automatic logic circuitry continuously compares and selects the superior received signal, providing better sound quality and reducing the possibility of dropouts. Front-end helical filter design improves rejection of interference. The receiver also offers balanced audio output with level control, a headphone jack with volume control, removable antennas, a hinged battery door, and LED indicators. It operates on two internal 9V batteries or external 12V DC.

Each transmitter is powered by one internal 9V battery and has an Off/Standby/On switch, input level control, battery condition indicator and channel selector switches. The ATW-T101 body-pack transmitter has an industry-standard TB5M input connector with both low- and high-impedance inputs plus a bias connection. The ATW-T102 has a 3-pin XLR-type input connector with a locking collar.

Please note that in multiple system applications there must be a transmitter-receiver combination set to a **separate** frequency for each input desired (only one transmitter for each receiver). Because the operating frequencies of U100 Systems are in UHF TV frequencies, only certain wireless frequencies may be useable in a particular geographic area. Also, only certain of the available operating frequencies may be used together. Suggestions for multiple-system frequency grouping will be found on page 7.

## Receiver Setup

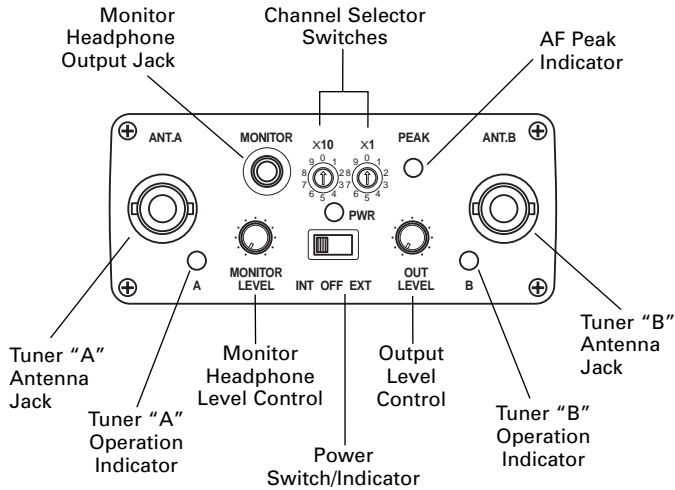


Fig. A

### Location

The ATW-R100 receiver is designed primarily to be mounted to professional video cameras (mounting methods and positions will vary with the camera being used). However, the receiver will provide outstanding professional performance in other wireless applications as well.

For best operation the receiver should be at least three feet above the ground and at least three feet away from a wall or metal surface to minimize reflections. The transmitter should be at least three feet from the receiver.

Keep antennas away from noise sources such as computers, motors, automobiles and neon lights; also keep antennas away from large metal objects.

### Output Connections

There is one balanced audio output (31.6 mV) on the back panel of the receiver. Use shielded audio cable to connect this XLRM-type 3-pin jack to the mic audio input of the camera or mixer.

A headphone jack and level control permit monitoring of the audio signal. Either mono or stereo headphones with a 3.5 mm plug may be used; the audio is supplied to both sides of a stereo unit.

### Antennas

Attach the antennas to the antenna input jacks. Make certain that during operation there is a clear open-air path between the receiver antennas and the transmitter.

### Power

The ATW-R100 receiver operates on either external DC or internal battery power by setting the Power switch to "EXT" or "INT" respectively (Fig. A). In the center position all power is off.

### External Power

The back panel is equipped with a jack for an external 12-18V DC source, 200 mA nominal current. The jack takes a standard 2.5 mm I.D. coaxial DC power plug, center **positive**.

### Battery Selection and Installation

Always use two fresh alkaline 9V batteries. Replace the batteries in pairs.

Open the hinged battery door on the side of the receiver. Insert two batteries, observing correct polarity as marked on the inside of the door. Close and latch the door.

Note that the battery door will not close fully if the batteries are installed incorrectly. **Do not force the door closed.**

The U100 Series receiver and transmitters accept most popular brands of 9-volt alkaline batteries. But there is considerable variation in battery sizes; some alkaline and extended-life batteries may not fit correctly, which can cause units to operate improperly or not at all.

## Transmitter Setup

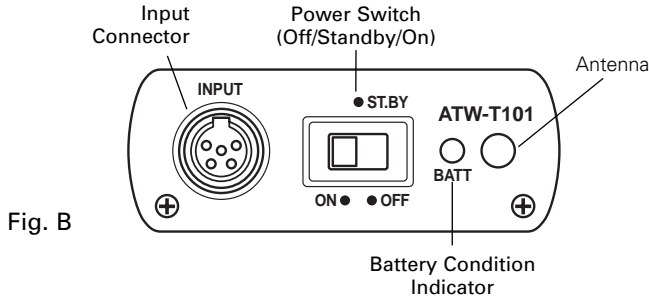


Fig. B

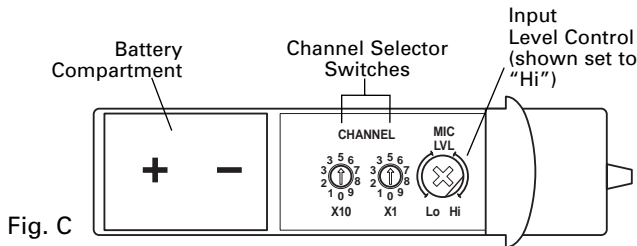


Fig. C

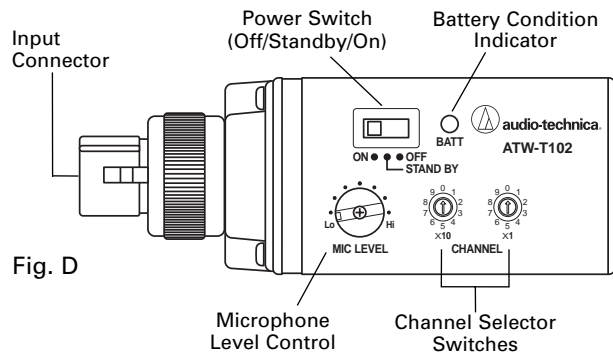


Fig. D

### Battery Selection and Installation

Always use a fresh alkaline 9V battery.

Open the hinged battery door. Insert the battery, observing correct polarity as marked inside the battery compartment. Close the battery door. **Do not force the door closed.**

### Battery Condition Indicator

After the battery is installed, turn the power on. The battery condition indicator LED (Fig. B/D) should flash momentarily. If it does not, the battery is installed incorrectly or it is dead.

If the indicator LED stays on (does not flash), the battery voltage is low and the battery should be replaced. If this happens during use, replace the battery immediately to ensure continued operation.

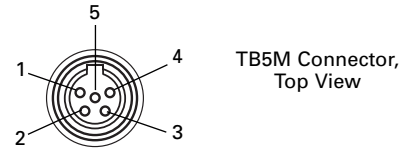
### Transmitter Input Connections

Connect a microphone to the audio input connector on the transmitter.

#### ATW-T101

The ATW-T101 body-pack transmitter has an industry-standard TB5M input connector with both low- and high-impedance inputs plus a bias connection.

#### ATW-T101 Input Connections



Pin	Transmitter Connections	Input Connections		
		Condenser Mic	Dynamic Mic	Hi-Z Line
1	Shield (Ground)	Shield/Bias -	Shield/Audio "-"	Shield/Audio "-"
2	Bias + Out	Bias + In	Open	Open
3	Lo-Z Mic In	Mic Audio	Mic Audio "+"	Jumper to Pin 1
4	Source Load (2.2 kΩ)	Jumper to Pin 1	Open	Jumper to Pin 1
5	Hi-Z Line In	Open	Open	Line Audio "+"

#### ATW-T102

The ATW-T102 plug-on transmitter has a 3-pin XLR-type input connector with a locking collar. To attach the microphone, rotate the threaded locking collar **fully** clockwise ("down") until it reaches the transmitter housing (Fig. E1). Then rotate the collar back "up" one or two turns to expose the microphone latch.

Press the microphone and transmitter together (Fig. E2), making certain that the latch "clicks" into the base of the mic. Pull on the mic to make certain it is latched on the connector.

Continue to rotate the threaded collar "up" until it is **firmly** against the end of the mic (Fig. E3). Make certain the mic is securely attached before use.

To detach the microphone, reverse the steps above. **Always** loosen the threaded collar **fully** before attempting to disconnect the mic.

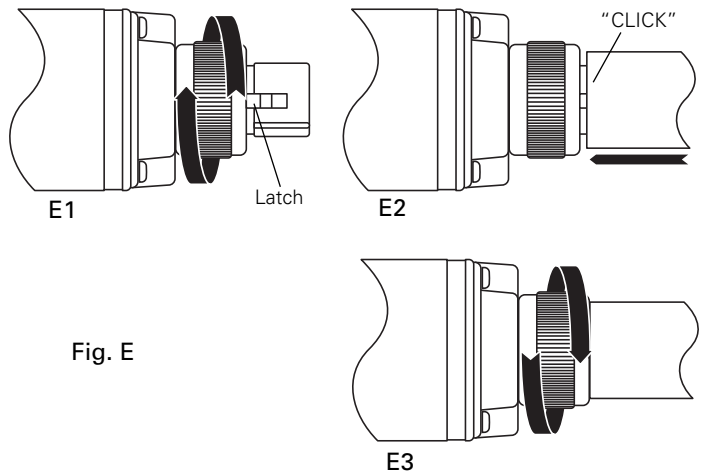


Fig. E

### ATW-T102 Input Connections

Pin 1	Case Ground
Pin 2	Audio “+” and 5V DC bias
Pin 3	Audio “-” and 5V DC bias

Use a dynamic microphone, or a condenser mic with an internal battery. In addition, the ATW-T102 provides a bias voltage of +5V on Pins 2 and 3 which will power some “battery/phantom” mics designed to work at this low voltage. However, the ATW-T102 will not power a “phantom powered” mic which requires the more-typical 12 to 48 volts. Use of the bias voltage will reduce battery life slightly. Presence of the bias voltage will not affect dynamic microphones.

### Transmitting Antenna

The ATW-T101 body-pack transmitter includes a permanently-attached flexible antenna. For best results, allow the antenna to hang freely and full length from the bottom of the transmitter. If the received signal is marginal, experiment with different transmitter positions on your body; or try repositioning the receiver. Do not attempt to remove, replace or change the length of the transmitting antenna. (The stainless-steel mounting clip may be oriented in one of four “directions.” Loosen its mounting screw, reposition the clip in the case recess as desired and re-tighten the screw.)

The ATW-T102 plug-on transmitter’s antenna is housed in a non-metallic section between the metal transmitter case and the mic connector. For best operation, hold the body of the microphone itself and do not cover or obstruct the antenna area.

## System Operation

### Setting Channels

Use the provided screwdriver to set the channel selector switches on the receiver and transmitter to the same frequency (Fig. A/C/D).

As an example, setting the X10 selector on “5” and the X1 selector on “2” designates channel 52, operating at 734.625 MHz as shown on the chart on page 7.

**Be certain the units are turned off when making frequency changes.**

### Receiver On . . .

Turn down the output level of the receiver (OUT LEVEL) and the input level control of the camera or mixer.

Turn the receiver on, choosing either “INT” (internal battery) or “EXT” (external DC source) as appropriate. The power indicator LED (PWR) will light up strongly with fresh batteries. (If the LED becomes dim or extinguished, the batteries are weak and should be replaced immediately for reliable operation.)

If the tuner operation indicator LEDs (A and B) flicker, there may be RF interference. If this occurs, select another frequency. (Always turn the receiver off when making frequency changes.)

### Transmitter On . . .

Before turning on the transmitter, be certain the transmitter channel selector switches are set to the same numbers as those on the receiver.

Turn the transmitter on.

The transmitter has a three-position power switch. When the switch is set to “Standby,” (“ST.BY”) the transmitter produces RF with no audio signal. When the switch is “On,” the transmitter produces both RF and audio. With the switch “Off,” there is minimum noise output from the receiver due to a special A-T muting system.

### Setting Mic Levels

CAUTION! Adjust the Mic Level control *carefully*. Unlike the Channel Selector switches, it will *not* rotate continuously!

The microphone input accommodates a wide range of mics with typical sensitivity ratings of 1.5 mV (–56 dBV) to 15 mV

(–36 dBV) at 1 Pascal/94 dB SPL, while providing excellent signal-to-noise ratios and maximum-acoustic-input levels.

1. Set the transmitter Mic Level control to the full counter-clockwise (Lo) position.
2. Make an initial adjustment of the receiver output and camera/mixer input level controls that will allow audio through the system as you increase the transmitter Mic Level.
3. Plug in the mic and power up the system.
4. While speaking/singing into the microphone at typically-loud levels, increase the transmitter Mic Level adjustment until the maximum audio output of the mic lights the receiver’s Peak indicator. (Do not set the transmitter level too high – doing so will cause the system to overload and distort.)
5. Now, while speaking/singing into the microphone at typically-loud levels, adjust the output level of the receiver so the highest sound pressure level going into the microphone causes no input overload in the camera/mixer, and yet permits the camera/mixer level controls to operate in their “normal” range (not set too high or too low). This provides the optimum signal-to-noise for the entire system.

### Setting Line Level (ATW-T101)

When using a line-level source with the ATW-T101 transmitter, set the input level using the same method given above. The Mic Level (MIC LVL) control adjusts audio gain for both mic and line inputs.

### RF Interference

Please note that wireless frequencies are shared with other radio services. According to Federal Communications Commission regulations, “Wireless microphone operations are unprotected from interference from other licensed operations in the band. If any interference is received by any Government or non-Government operation, the wireless microphone must cease operation . . .”

If you need assistance with operation or frequency selection, please contact your dealer or the Audio-Technica professional division.

Extensive wireless information also is available on the Audio-Technica Web site at [www.audio-technica.com](http://www.audio-technica.com).

## Specifications†

### Overall System

Operating Frequency	UHF band, 728.125-740.500 MHz
Number of Channels	100 total
Frequency Stability	±0.005%, Phase Lock Loop frequency control
Modulation Mode	FM
Normal Deviation	±10 kHz
Operating Range	300' typical (ATW-U102: 200' typical)
Operating Temperature Range	41° F (5° C) to 113° F (45° C)
Frequency Response	100 Hz to 15 kHz

### ATW-R100 Receiver

Receiving System	Dual independent receivers, automatic switching diversity
Image Rejection	35 dB nominal
Signal-to-Noise Ratio	107 dB at 30 kHz deviation (IEC-weighted), maximum modulation 75 kHz
Total Harmonic Distortion	<1% (10 kHz deviation at 1 kHz)
Sensitivity	26 dBμV, (S/N 60 dB at 5 kHz deviation, IEC-weighted)
Intermediate Frequency	45 MHz, 10.7 MHz
Audio Output (balanced)	31.6 mV (at 1 kHz, ±5 kHz deviation, 10k ohm load)
Output Connector	3-pin XLRM-type
Monitor Headphone Output (typical)	75 mW max. at 1 kHz, 1% T.H.D., into 32 ohm (each channel) stereo headphones
Monitor Headphone Jack	3.5 mm TRS, signal on both Tip and Ring
External Power Requirements	12V DC nominal, 200 mA
Batteries	Two 9V (NEDA type 1604) alkaline, not included
Current Consumption	130 mA typical
Battery Life	Approximately 5-7 hours (depending on battery type and use pattern)
Dimensions	3.35" (85.0 mm) W x 4.53" (115.0 mm) H x 1.42" (36.0 mm) D
Net Weight (without batteries)	12.0 oz (340 grams)
Accessories Included	Two flexible UHF antennas; control screwdriver

### ATW-T101 Body-pack Transmitter

RF Power Output	50 mW Max
Spurious Emissions	Under federal regulations
Input Connector	TB5M
Line Input Impedance/Level	100k ohms/3.16V max. input at 1 kHz, 1% T.H.D.
Battery	9V (NEDA type 1604) alkaline, not included
Current Consumption	50 mA typical
Battery Life	Approximately 8-10 hours (depending on battery type and use pattern)
Dimensions	2.52" (64.0 mm) W x 3.78" (96.0 mm) H x 0.91" (23.0 mm) D
Net Weight (without battery)	5.0 oz (143 grams)

### ATW-T102 Plug-on Transmitter

RF Power Output	50 mW Max
Spurious Emissions	Under federal regulations
Input Connector	3-pin XLRF-type
Battery	9V (NEDA type 1604) alkaline, not included
Current Consumption	60 mA typical
Battery Life	Approximately 7-9 hours (depending on battery type and use pattern)
Dimensions	1.58" (40.0 mm) W x 4.32" (109.8 mm) H x 1.58" (40.0 mm) D
Net Weight (without battery)	6.2 oz (177 grams)

† In the interest of standards development, A.T.U.S. offers full details on its test methods to other industry professionals on request.

## Optional Accessory Microphones

**AT831cT5** Miniature cardioid condenser microphone, terminated with a TA5F connector for use with the ATW-T101 transmitter. Includes clothing clip and windscreen.

**MT830cT5** Subminiature omnidirectional condenser microphone, terminated with a TA5F connector for use with the ATW-T101 transmitter. Includes clothing clip and windscreens.

**MT830cT5-TH** "Theater" model, same as MT830cT5 except beige color mic and cable for concealment.

### U100 Series Compatible with 7000 Series Wireless

For greater convenience and flexibility, receivers and transmitters in the Audio-Technica U100 Series and 7000 Series are available individually and may be used interchangeably. All are 100-channel, PLL-synthesized UHF units operating on the same frequency-set.

Series	Receiver	Description
U100	ATW-R100	Miniaturized, battery-powered receiver
7000	ATW-R73	Half-rack-mount, AC-powered receiver
Series	Transmitter	Description
U100	ATW-T101	Body-pack transmitter, metal case, TB5M input connector
U100	ATW-T102	Plug-on transmitter for separate microphone
7000	ATW-T75	Body-pack transmitter, plastic case, HRS input connector (Requires A-T mics with model numbers ending in "cW.")
7000	ATW-T76	Integrated handheld microphone/transmitter

For future reference, please record your system information here.

Receiver	ATW-R100	Serial Number	_____
Transmitter	ATW-T101	Serial Number	_____
	ATW-T102	Serial Number	_____

## Audio-Technica U100 Series UHF Wireless Operating Frequencies

### U100 Frequency and Channel Designator List

Designator	Frequency (MHz)	TV Channel	Designator	Frequency (MHz)	TV Channel
00	728.125	57	50	734.375	58
01	728.250	57	51	734.500	58
02	728.375	57	52	734.625	58
03	728.500	57	53	734.750	58
04	728.625	57	54	734.875	58
05	728.750	57	55	735.000	58
06	728.875	57	56	735.125	58
07	729.000	57	57	735.250	58
08	729.125	57	58	735.375	58
09	729.250	57	59	735.500	58
10	729.375	57	60	735.625	58
11	729.500	57	61	735.750	58
12	729.625	57	62	735.875	58
13	729.750	57	63	736.000	58
14	729.875	57	64	736.125	58
15	730.000	57	65	736.250	58
16	730.125	57	66	736.375	58
17	730.250	57	67	736.500	58
18	730.375	57	68	736.625	58
19	730.500	57	69	736.750	58
20	730.625	57	70	736.875	58
21	730.750	57	71	737.000	58
22	730.875	57	72	737.125	58
23	731.000	57	73	737.250	58
24	731.125	57	74	737.375	58
25	731.250	57	75	737.500	58
26	731.375	57	76	737.625	58
27	731.500	57	77	737.750	58
28	731.625	57	78	737.875	58
29	731.750	57	79	738.000	58
30	731.875	57	80	738.125	58
31	732.000	57	81	738.250	58
32	732.125	57	82	738.375	58
33	732.250	57	83	738.500	58
34	732.375	57	84	738.625	58
35	732.500	57	85	738.750	58
36	732.625	57	86	738.875	58
37	732.750	57	87	739.000	58
38	732.875	57	88	739.125	58
39	733.000	57	89	739.250	58
40	733.125	57	90	739.375	58
41	733.250	57	91	739.500	58
42	733.375	57	92	739.625	58
43	733.500	57	93	739.750	58
44	733.625	57	94	739.875	58
45	733.750	57	95	740.000	59
46	733.875	57	96	740.125	59
47	734.000	58	97	740.250	59
48	734.125	58	98	740.375	59
49	734.250	58	99	740.500	59

#### Multi-channel Systems

Following are groupings of frequencies suggested for multi-channel wireless systems.

Group A: Channels 00, 02, 08, 15, 46, 50, 60 (or 62), 71, 76, 80, 93, 99 -or-

Group B: Channels 01, 03, 07, 25, 30, 41, 44, 56, 69, 76, 77, 86

For use where TV Channel 57 is operating:

Channels 50, 60 (or 62), 71, 76, 80, 93, 99 (from Group A) -or-

Channels 56, 69, 76, 77, 86 (from Group B)

For use where TV Channel 58 is operating:

Channels 00, 02, 08, 15, 46, 99 (from Group A) -or-

Channels 01, 03, 07, 25, 30, 41, 44 (from Group B)

For use where TV Channel 59 is operating:

Channels 00, 02, 08, 15, 46, 50, 60 (or 62), 71, 76, 80, 93 (from Group A) -or-

Channels 01, 03, 07, 25, 30, 41, 44, 56, 69, 76, 77, 86 (All of Group B)



## **Ten Tips To Obtain The Best Results**

1. Use only fresh alkaline batteries; replace the receiver batteries in pairs. Do not use "general purpose" (carbon-zinc) batteries.
2. Position the receiver so that it has the fewest possible obstructions between it and the normal location of the transmitter. Line-of-sight is best.
3. The transmitter and the receiver should be as close together as conveniently possible, but no closer together than three feet.
4. The receiver antennas should be in the open and away from any metal.
5. The transmitter and receiver must be set to the same channel number.
6. Only one transmitter on a given frequency should be "on" at a time.
7. The power switch on the transmitter has three positions: "Off," "Standby," and "On." In the middle "Standby" position, the transmitter sends only RF to the receiver; the audio source is turned off.
8. If the "Out Level" of the receiver is set too high, it may over-drive the input of the camera/mixer or clip the output of the receiver, causing distortion. Conversely, if the receiver output is set too low, the overall signal-to-noise ratio of the system may be reduced.
9. You need to change channels 1) when a strong interference signal is received, 2) when the channel breaks down, or 3) during multiple-system operation in order to select an interference-free channel. Always turn the units off before changing frequencies.
10. Turn the receiver and transmitter off when not in use. Remove the batteries during long-term storage.

### **One-Year Limited Warranty**

Audio-Technica professional wireless systems purchased in the U.S.A. are warranted for one year from date of purchase by Audio-Technica U.S., Inc. (A.T.U.S.) to be free of defects in materials and workmanship. In event of such defect, product will be repaired promptly without charge or, at our option, replaced with a new product of equal or superior value if delivered to A.T.U.S. or an Authorized Service Center, prepaid, together with the sales slip or other proof of purchase date. **Prior approval from A.T.U.S. is required for return.** This warranty excludes defects due to normal wear, abuse, shipping damage, or failure to use product in accordance with the instructions. This warranty is void in the event of unauthorized repair or modification, or removal or defacing of the product labeling.

**For return approval and shipping information,** contact the Service Dept., Audio-Technica U.S., Inc., 1221 Commerce Drive, Stow, Ohio 44224.

Except to the extent precluded by applicable state law, **A.T.U.S. will have no liability for any consequential, incidental, or special damages; any warranty of merchantability or fitness for particular purpose expires when this warranty expires.**

This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

Outside the U.S.A., please contact your local dealer for warranty details.

