freeway™

700 Series Professional UHF Wireless Systems

ATW-701	UniPak® Transmitter System
ATW-701/G	Guitar System
ATW-701/H	Headworn Microphone System
ATW-701/H92	Headworn Microphone System
ATW-701/H92-TH	Headworn Microphone System
ATW-701/L	Lavalier Microphone System
ATW-702	Handheld Dynamic Microphone System

Installation and Operation

audio-technica®

Professional UHF Wireless 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. Changes or modifications not expressly approved by Audio-Technica could void your authority to operate this equipment.

CAUTION! Electrical shock can result from removal of the receiver cover. Refer servicing to qualified service personnel. No user-serviceable parts inside. Do not expose to rain or moisture.

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.

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.

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 microphone system is the successful result of years of design and manufacturing experience.

Each 700 Series wireless system provides a choice of eight PLL synthesized UHF frequencies in the 542-561 MHz band (TV channels 26-29). All 700 Series wireless systems offer both manual and automatic frequency scanning. Each wireless system includes a receiver and either a body-pack or handheld transmitter. Individual components are also available separately.

The ATW-R700 receiver features Diversity Reception. Logic circuitry monitors reception, selecting the superior signal from two antennas, providing better sound quality and reducing the possibility of interference and dropouts. Soft-touch controls provide convenient access to selection of operating frequency and automatic scanning, while an LED display indicates selected channel and scanning operation.

The versatile ATW-T701 UniPak® body-pack transmitter has both low- and high-impedance inputs plus a bias connection, for use with dynamic and electret condenser microphones, as well as Hi-Z instrument pickups. The UniPak® transmitter also offers separate trim controls for guitar and microphone, plus switchable high/low RF power.

The ATW-T702 handheld dynamic microphone/transmitter features a rugged dynamic unidirectional element designed for professional live-sound venues.

Transmitters in the 700 Series use two 1.5V AA batteries for economical operation and wide availability. Both transmitters also feature a multi-color Power/Mute/Battery indicator.

700 Series receivers feature a sophisticated Tone Lock™ tone squelch system that opens the receiver's audio output only when a 700 Series transmitter is detected, reducing the possibility of interference. As a result, 700 Series transmitters and receivers must be used together and should not be used with components from other Audio-Technica wireless systems, or with those of other manufacturers.

Please note that in multiple-system applications there must be a transmitter-receiver combination set to a separate channel (frequency) for each input desired (only one transmitter for each receiver).

Because the wireless frequencies are within UHF TV frequency bands, only certain channels (operating frequencies) may be useable in a particular geographic area. The eight channels (operating frequencies) that are used in the 700 Series have been selected for multi-channel compatibility. Subject to frequency availability in a particular geographic area, any of these eight channels may be used together.

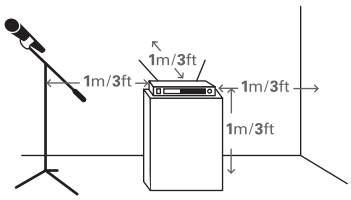
The operating frequencies that correspond to each of the eight channels are listed on page 7.

Receiver Installation

Location

For best operation the receiver should be at least 3 ft. (1 m) above the ground and at least 3 ft. away from a wall or metal surface to minimize reflections. The transmitter should be at least 3 ft. from the receiver, as shown in Figure A. Keep antennas away from noise sources such as digital equipment, motors, automobiles and neon lights, as well as away from large metal objects.

Figure A



Output Connections

There are two audio outputs on the back panel: balanced (-16.5 dBV) and unbalanced (-13.5 dBV). Use shielded audio cable for the connection between the receiver and the mixer. If the input of the mixer is a 1/4" jack, connect a cable from the 1/4" unbalanced audio output on the back of the receiver housing to the mixer. If the input of the mixer is an XLR-type input, connect a cable from the balanced XLR-type audio output on the back panel to the mixer.

Antennas

Extend the permanently attached UHF antennas. The antennas are normally positioned in the shape of a "V" (both 45° from vertical) for best reception. Diversity Indicators on the receiver front panel will indicate which antenna is active.

Power Connections

Connect the DC plug on the included AC power adapter to the DC power input on the back of the receiver. Secure the cord over the cord hook on the back of the receiver, to keep the plug from being detached by an accidental tug on the cord. Then plug the adapter into a standard 120 Volt 60 Hz AC power outlet.

Receiver Controls and Functions

Figure B1-Antenna Position

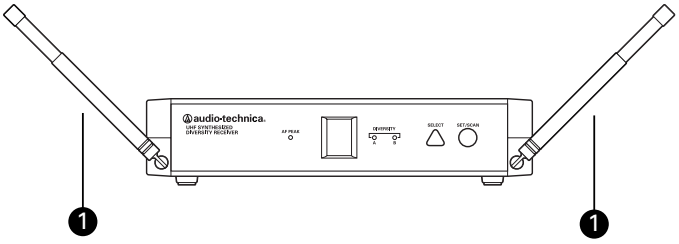
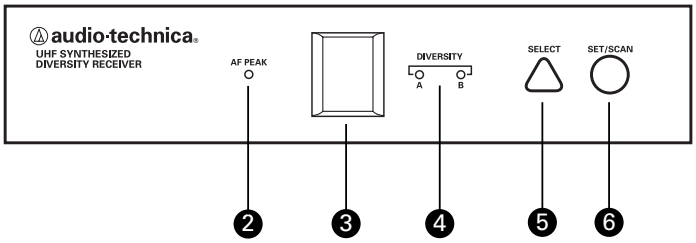


Figure B2-Front Panel Controls and Functions

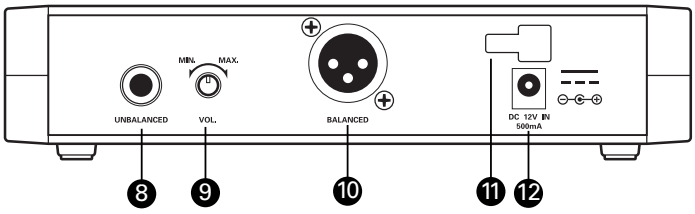


1. ANTENNAS: Position the antennas as shown in Figure B1. Fully extend both antennas by pulling on the endcaps.
2. AF PEAK INDICATOR: Indicates when maximum transmitter modulation without distortion has been reached. Not affected by position of Volume control (Fig. C).
3. LED WINDOW: LED Display indicates channel setting and scanning operation.
4. DIVERSITY INDICATORS: Indicates which antenna (A or B) has better reception and is in operation.
5. SELECT BUTTON (for **manual channel selection**): Press the Select button repeatedly until desired channel is reached. Press and hold the Set/Scan button to manually set the receiver to indicated channel. Channel number will stop flashing. (A brief touch of the Set/Scan button will revert to previously set channel). If the Set button is not pressed within 10 seconds to confirm the selection, the system will revert to its original channel.
6. SET/SCAN BUTTON: The Set/Scan button can be used in two ways: 1) in conjunction with the Select button to permit manual selection of an operating channel in **Manual Set Mode** (see "Select button" description above); and 2) Automatic Scan/Set Mode, to initiate the automatic channel scan and selection, as follows:

   Automatic Scan/Set Mode: Press and hold the Set/Scan button for about two seconds. The current channel will flash three times quickly; then the system will begin to scan for the next open channel. When it finds an open channel, it will flash the open channel three times and then set the channel. (If an open channel is not found, the automatic scan will return to the original channel and flash 5 times.)

Receiver Controls and Functions (Continued)

Figure C-Rear Panel Controls and Functions



8. UNBALANCED AUDIO OUTPUT JACK: 1/4" phone jack. Can be connected to an unbalanced aux-level input of a mixer, guitar amp or tape recorder.

9. AF LEVEL (VOLUME) CONTROL: Adjusts audio output level of both AF Output jacks; maximum output is fully clockwise.

10. BALANCED AUDIO OUTPUT JACK: XLRM-type connector. A standard 2-conductor shielded cable can be used to connect the receiver output to a balanced microphone-level input on a mixer or integrated amplifier.

11. CORD HOOK: Loop the cord around the cord hook to keep the DC plug from pulling out accidentally.

12. POWER INPUT JACK: Connect the DC plug from the included in-line AC adapter.

Transmitter Setup, Controls and Functions

Battery Selection

Two 1.5V AA alkaline batteries are recommended.

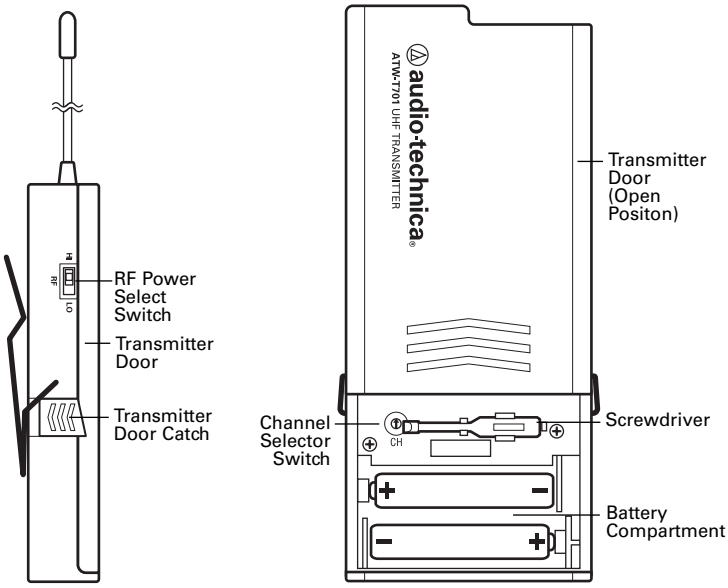
UniPak® Transmitter Battery Installation

1. Open the transmitter door by first pulling the catch down and then sliding the door upward (Fig. D).

2. Observe correct polarity as marked and carefully insert two fresh 1.5V AA alkaline batteries (Fig. D).

3. Slide the door closed, making certain it clicks securely in place.

Figure D-UniPak Transmitter



Handheld Transmitter Battery Installation

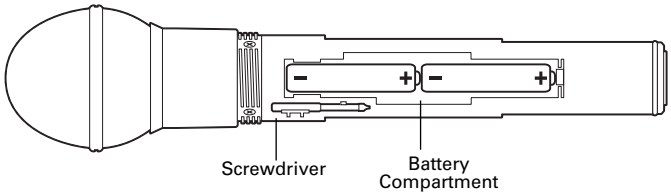
4. Unscrew the lower body cover, slide it downward, and remove it to expose the battery compartment.

5. Observe correct polarity as marked inside the battery compartment and carefully insert two fresh 1.5V AA alkaline batteries. Insert the first battery and slide it toward the spring contact. Then insert the second battery into the space remaining. Make certain the batteries are fully seated in the battery compartment. (Fig. E)

6. Slide the lower body cover back on and screw the housing together. Do not overtighten.

Note: Remove batteries from the handheld transmitter starting at the bottom end, where finger indents in the battery housing are provided for easy grip.

Figure E-Handheld Transmitter Battery Compartment



Transmitter Setup, Controls And Functions

Power/Mute/Battery Indicator

After the battery is installed, press and hold the power button until the battery indicator LED turns green (Fig. F & G). (It will turn red first; keep holding until it turns green). If the battery indicator LED does not light up when the power button is pressed, the batteries are installed incorrectly or they are dead. The LED will flash to indicate low-battery condition.

Figure F-UniPak® Transmitter Top View

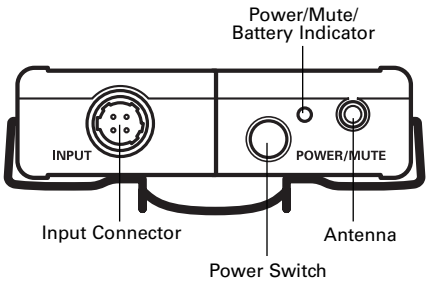
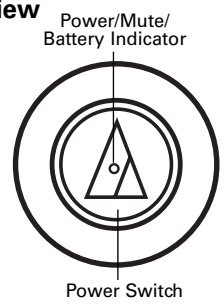


Figure G-Handheld Transmitter Bottom View



Mute Function

With the transmitter on, a slight touch of the Power/Mute button will toggle between muted and unmuted operation. Red LED indicates muted operation. Green LED indicates unmuted operation.

UniPak® Transmitter Input Connection

Connect an audio input device (microphone or guitar cable) to the audio input connector on the top of the transmitter. A number of Audio-Technica professional microphones and cables are available separately, pre-terminated with a UniPak® input connector (see www.audio-technica.com.)

UniPak® Transmitter Antenna

The UniPak® transmitter includes a permanently-attached flexible antenna. For best results, allow the antenna to hang freely and full length from the transmitter. If the received signal is marginal, experiment with different transmitter positions on your body or instrument; or try repositioning the receiver. Do not attempt to remove, replace or change the length of the transmitting antenna.

System Operation

Plug in the receiver.

Receiver On…

The LED display will light up. If either A or B diversity indicators lights up at this point (without transmitter on) there may be interference in the area. If this occurs, change the operating channel.

How to Make Operating Channel Changes

Operating channel changes (frequency changes) may be made in two ways: manually and automatically.

To change channel manually

Press the Select button repeatedly until desired channel is reached. Press and hold the Set/Scan button to manually set the receiver to indicated channel. Channel number will stop flashing. (A brief touch of the Set/Scan button will revert to previously set channel). If the Set button is not pressed within 10 seconds to confirm the selection, the system will revert to its original channel.

To change channel automatically

Press and hold the Set/Scan button for about two seconds. The current channel will flash three times quickly; then the system will begin to scan for the next open channel. When it finds an open channel, it will flash the open channel three times and then set the channel. (If an open channel is not found, the automatic scan will return to the original channel and flash 5 times.)

Transmitter On…

Before turning on the transmitter, use the provided screwdriver to set the transmitter channel selector switches (Fig. D on page 4 and Fig. H on page 6) to the same number that is displayed on the receiver. Select channels 1-8 (channels 9 and 0 are for service use). The transmitter may be either on or off when changing channels (frequencies). When changing channels with the transmitter on and *unmuted*, the LED will turn red as the adjustment is being made; it will turn green when the channel is set. (When changing channels with the transmitter on and *muted*, the LED will remain red during and after channel adjustment, as long as the transmitter is muted; when the transmitter is unmuted, the LED will turn green.)

The transmitters have a soft-touch Power Switch. When the transmitter is "on," the transmitter produces both RF and audio.

When the transmitter is switched on and in normal operation, the receiver's diversity indicators will display which antenna is active.

Setting Levels

Correct adjustment of transmitter audio input, receiver audio output, and mixer/amplifier input and output levels is important for optimum system performance.

ATW-T702 Handheld Transmitter

The 700 Series handheld transmitter trim (volume) control (Fig. H on page 6) has factory pre-set audio input levels. Factory setting is full clockwise, maximum gain.

Set the receiver's AF Level control to its full clockwise position (maximum). (Fig. C on page 4).

While speaking/singing into the microphone at typically loud levels, check the AF peak indicator on the receiver. If the AF peak indicator is easily illuminated and distortion is heard through the system, it may be necessary to adjust the transmitter audio input level.

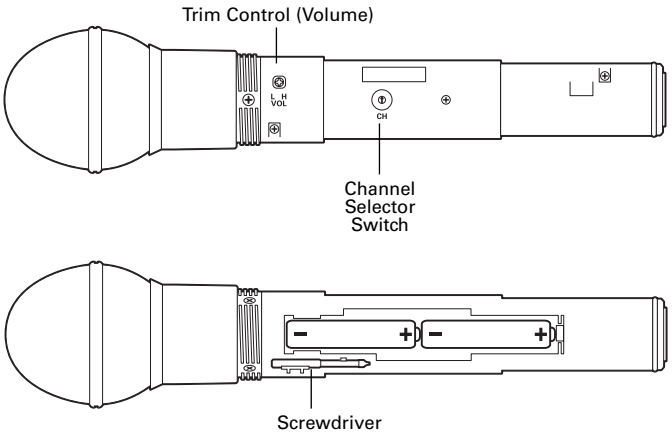
To adjust the transmitter audio input level, unscrew the lower body cover and slide it downwards, exposing the screwdriver and trim control (Fig. H on page 6). Remove the screwdriver and gently turn the trim control counterclockwise until the AF peak indicator is illuminated only on audio peaks.

Return the screwdriver to its clip and close and secure the lower body. No further transmitter gain adjustments should be needed, as long as the acoustic input does not change significantly.

Setting Levels (Continued)
ATW-T702 Handheld Transmitter

CAUTION! The small trimmer controls are delicate; use only the supplied screwdriver. Do not force the trimmers beyond their normal 180° range of rotation.
Return the screwdriver to its storage clip when not in use.

Figure H-Handheld Transmitter Interior View



ATW-T701 UniPak® Transmitter
Trim controls in the UniPak transmitter (Fig. I) will enable you to use microphones or instruments with different output levels.

1. For MIC: Set MIC (microphone trim) control fully clockwise (maximum) and INST (instrument trim) control fully counter clockwise (low).

   For INSTRUMENT: Set INST (instrument trim) control fully clockwise (maximum) and MIC (microphone trim) control fully counterclockwise (low).

2. Set the receiver's AF Level control to its full clockwise position (maximum). (Fig. C on page 4).

3. Plug the mic or instrument into the transmitter and power up the system.

4. For MIC: Make an initial adjustment of the mixer's level controls that will allow audio through the system.

   For INSTRUMENT: Make an initial adjustment of the instrument amplifier input level control that will allow audio through the system.

5. For MIC: While speaking/singing into the microphone at typically loud levels, check the AF peak indicator on the receiver. If AF peak indicator is easily illuminated and distortion is heard through the system, it may be necessary to adjust the transmitter audio input level. To adjust the transmitter audio input level, gently turn the microphone trim control counterclockwise until the AF peak indicator is illuminated only on audio peaks.

   For INSTRUMENT: While playing the instrument at typically loud levels, check the AF peak indicator on the receiver. If AF peak indicator is easily illuminated and distortion is heard through the system, it may be necessary to adjust the transmitter audio input level. To adjust the transmitter audio input level, gently turn the instrument trim control counterclockwise until the AF peak indicator is illuminated only on audio peaks.

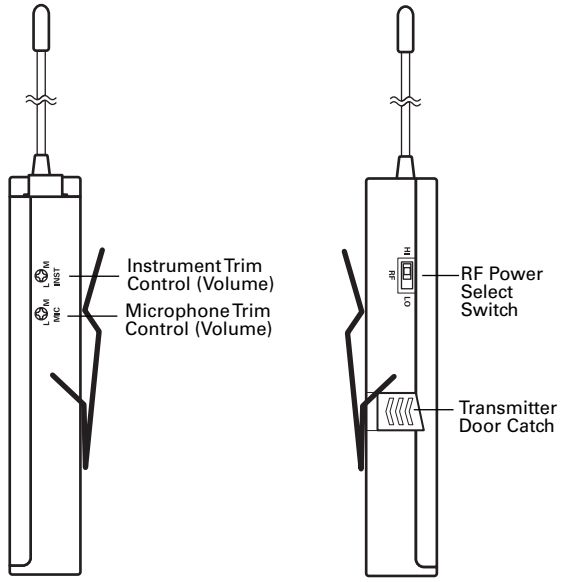
6. For MIC: While again speaking/singing into the microphone at typically loud levels, adjust the mixer's input trim control so the highest sound pressure level going into the microphone causes no input overload in the mixer, and yet permits the mixer's channel and output level controls to operate in their "normal" range (not set too high or too low).

   For INSTRUMENT: While again playing the instrument at typically loud levels, adjust the receiver's AF Level control so the highest signal level causes no input overload in the instrument amplifier and yet permits the amplifier's input level controls to operate in their "normal" range (not set too high or too low).

Note: If the mixer cannot be adjusted to operate in its normal range without distortion, adjust the receiver's AF Level Control (turn counterclockwise) until the mixer/amplifier is no longer overloaded.

Note: RF power may be set to high or low via the RF power select switch on the side of the UniPak transmitter. (Fig. I.) While the high setting normally provides maximum operating range, the low setting will help extend battery life. The low setting may also be preferred in multi-channel systems, or when operating very close to the receiver, to reduce the possibility of interference or overload.

Figure I-UniPak® Transmitter Side Views



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 Audio-Technica. Extensive wireless information is also available on the Audio-Technica Web site at www.audio-technica.com.

700 Series UHF Operating Frequencies

Each transmitter/receiver system operates on a choice of eight switch-selected frequencies. Available frequencies are shown in the chart. All frequencies may be combined for up to 8 simultaneous operating channels.

700 Series Frequency Channel Plan

Channel	Frequency - MHz	TV Channel
1	542.125	26
2	545.750	
3	551.500	27
4	552.000	
5	557.875	28
6	559.375	
7	560.500	29
8	561.250	

Specifications†

OVERALL SYSTEM

UHF Operating Frequency	542.125 MHz to 561.250 MHz
Number of Channels	8
Frequency Stability	±0.005%, Phase Lock Loop Frequency control
Modulation Mode	FM
Maximum Deviation	±25 kHz
Operating Range	200' typical
Operating Temperature Range	40º F (4ºC) to 110º F (43º C)
Frequency Response	100 Hz to 12 kHz

RECEIVER

Receiving System	Antenna Switching Diversity
Image Rejection	55 dB minimum
Signal-to-noise Ratio	>80 dB at 10 kHz deviation (IEC weighted), maximum deviation 25 kHz
Total Harmonic Distortion	≤1% (10 kHz deviation @ 1 kHz)
Sensitivity	25 dBµV (S/N 60 dB at 10 kHz deviation, IEC-weighted)
Audio Output	
Unbalanced	211 mV (-13.5 dBV) (1 kHz modulation, 10 kHz deviation)
Balanced	150 mV (-16.5 dBV) (1 kHz modulation, 10 kHz deviation)
Output Connectors	
Unbalanced	1/4" TS ("mono") phone jack
Balanced	XLRM-type
Power Supply	100-240 VAC (50/60 Hz) to 12V DC 1A (center positive) switched mode, external power supply
Dimensions	7.48" (190.0 mm) W x 1.65" (42.0 mm) H x 5.12" (130.0 mm) D
Net Weight	12.9 oz (365 g)
Accessory Included	Power supply

UNIPAK® TRANSMITTER

RF Power Output	High: 10 mW; Low: 5 mW
Spurious Emissions	Under Federal Regulations
Dynamic Range	>100 dB, A-weighted
Input Connections	High impedance, Low impedance, Bias
Batteries (not included)	Two 1.5V AA Alkaline
Current Consumption	High: 140 mA; Low: 130 mA, typical
Battery Life	Approximately 8 hours (High); 10 hours (Low), depending on battery type and use pattern
Dimensions	2.56" (65.0 mm) W x 4.13" (105.0 mm) H x 0.73" (18.5 mm) D
Net Weight (without batteries)	2.8 oz (80 g)

HANDHELD TRANSMITTER

RF Power Output	10 mW
Spurious Emissions	Under Federal Regulations
Dynamic Range	>100 dB, A-weighted
Microphone Element	Dynamic Unidirectional
Batteries (not included)	Two 1.5V AA Alkaline
Current Consumption	120 mA, typical
Battery Life	Approximately 12 hours depending on battery type and use pattern
Dimensions	9.65" (245.0 mm) long, 2.11" (53.5 mm) diameter
Weight (without batteries)	9.1 oz (257 g)
Accessory Included	AT8456a Quiet-Flex™ stand clamp

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

Specifications are subject to change without notice.

Ten Tips to Obtain the Best Results

1. Use only fresh alkaline batteries. 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 must be set to the same frequency. Set or change transmitter frequency only when its power is turned off.
4. The transmitter and the receiver should be as close together as conveniently possible, but no less than six feet (2 m.).
5. Yellow LED indicates the channel is set to service position (0 or 9); please select a valid operating channel (1-8).
6. The receiver antennas should be kept away from any metal.
7. A receiver cannot receive signals from two transmitters at the same time.
8. If the AF Level control of the receiver is set too high, it may over-drive the input of the 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. Adjust the output level of the receiver so the highest sound pressure level going into the microphone (or the loudest instrument playing level) causes no input overload in the mixer, and yet permits the 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.
9. In the UniPak® transmitter, the "Mic" or "Inst" input control not in use should be set to minimum.
10. Turn the transmitter off when not in use. Remove the battery if the transmitter is not to be used for a period of time. Unplug the receiver from the AC outlet when the system is not in use.

For future reference, please record your system information here (the serial numbers appear inside the battery compartment of each transmitter, and on the bottom of each receiver):

Receiver	ATW-R700	S/N _____
UniPak® Body-Pack Transmitter	ATW-T701	S/N _____
Handheld Dynamic Microphone Transmitter	ATW-T702	S/N _____

audio-technica

Audio-Technica U.S., Inc., 1221 Commerce Drive, Stow, Ohio 44224 330/686-2600 www.audio-technica.com

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