Professional VHF Wireless Systems

ATW-1031 and ATW-1032 Installation and Operation

audio-technica®

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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.

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 professional wireless system includes a receiver and transmitter on a specific crystal-controlled frequency:

System	=	Receiver	+	Transmitter
ATW-1031		ATW-R10		ATW-T31 (UniPak™)
ATW-1032		ATW-R10		ATW-T32 (Hand-held)

The ATW-R10 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 interference and dropouts.

The versatile ATW-T31 UniPak 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. Two included cases protect the transmitter and provide convenient methods of attaching to belt or guitar straps. The ATW-T32 is an integrated hand-held microphone/transmitter, available with a choice of three elements: the standard unidirectional dynamic (ATW-T32); a Hi-Energy™ hypercardioid dynamic (ATW-T32-HE) featuring a neodymium magnet; and the ATW-T32-C with cardioid condenser element.

The ATW-T31 and ATW-T32 transmitters employ internal 9-volt batteries and offer the convenience of Off/Standby/On switches and battery condition indicators.

Please note that in a multi-channel application, there must be a transmitter-receiver combination on a ***separate*** frequency for each input desired (only one transmitter for each receiver). In addition, because the wireless frequencies are in or near VHF TV frequencies, only certain wireless frequencies are usable in a particular geographic area. (Frequency selection information will be found on page 7.)

Receiver Installation

Location

For best operation the receiver should be at least 3 ft. above the ground and at least 3 ft. away from a wall or metal surface to minimize reflections. The transmitter should also be at least 3 ft. away from the receiver, as shown in Figure A.

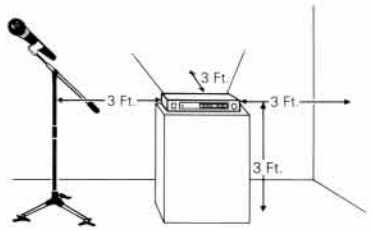


Fig. A Receiver Location

Keep antennas away from noise sources such as motors, automobiles, and neon lights, as well as large metal objects.

Output Connections

There are two audio outputs on the back of the receiver: mike-level (0.1V) balanced and line-level (0.4V) unbalanced. Use shielded audio cable for the connection between the receiver and the mixer. If the input of the mixer/amp is a 1/4" instrument-level jack, connect a cable from the 1/4" unbalanced audio output on the back of the receiver to the mixer/amp. If the mixer has an XLR mike-level input, connect a cable from the balanced XLR audio output on the back of the receiver to the mixer's input.

The two isolated audio outputs permit simultaneous feeds to both unbalanced and balanced inputs. For example, the receiver can act as a direct-box, driving both a guitar amp and a mixer.

Antennas

Assemble the two whip antennas to the special connectors provided. Screw the whips into the threaded ***side*** holes at the rear of the connectors (Fig. B).

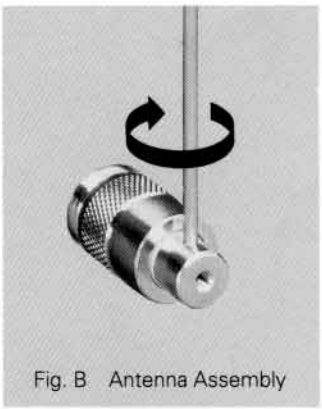


Fig. B Antenna Assembly

Attach the two receiving antennas to the antenna input jacks. The antennas normally are positioned in the shape of a "V" (45° from vertical) for best reception (Fig. A).

Do *not* try to move the antenna rod after the connector shell has been tightened down. Always loosen the connector shell completely before repositioning the antenna rod.

If there is not sufficient space above the receiver and/or if it is installed in a metal cabinet, the antennas can also be assembled using the alternate threaded holes in the connectors so the antennas will stick straight out from the back of the receiver. Use one set of threaded holes or the other; do not attempt to bend the antenna rods. For additional flexibility, the optional accessory ATW-RA15 rack-mount adapters bring antenna inputs to the front of the receiver.

Power Connections

Connect to a standard 120 volt 60 Hz AC power outlet. If there is no AC power available, the back panel is equipped with a jack for an external 12 to18 volt DC source. The jack takes a standard 2.5 mm I.D. co-axial DC power plug, center ***negative***.

Fig. C ATW-R10 Front Panel

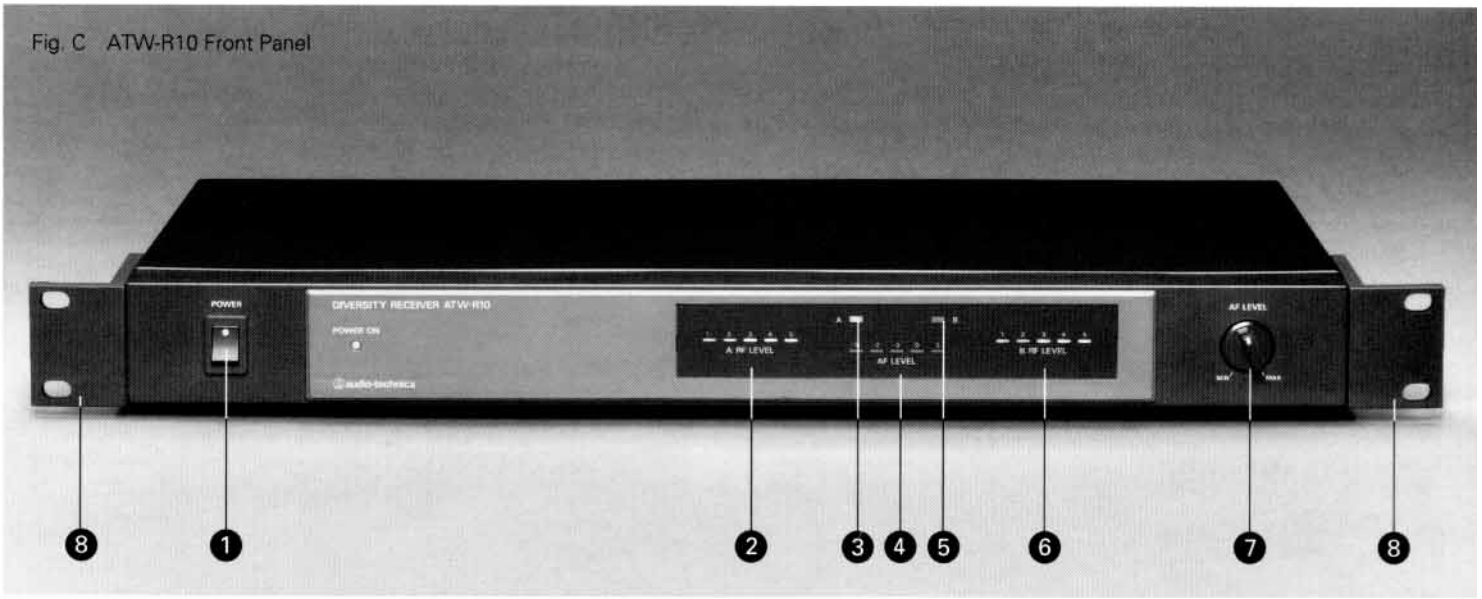
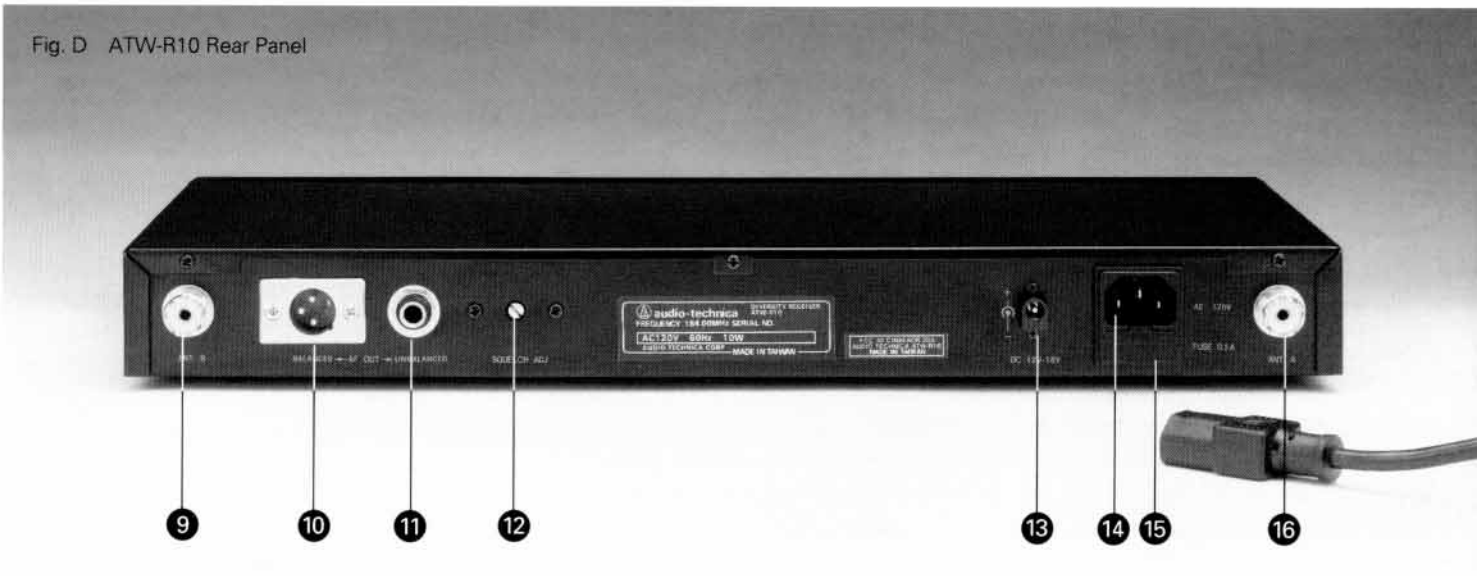


Fig. D ATW-R10 Rear Panel



Front Panel Controls and Functions (Fig. C)

1. POWER SWITCH: Press switch on, and the "Power On" LED will light.
2. RF SIGNAL LEVEL INDICATOR FOR "A" TUNER: Indicates the strength of RF signal from the transmitter. The LED's will light up from left to right.
3. TUNER "A" OPERATION INDICATOR: This LED indicates tuner "A" has the better reception and is in operation.
4. AF LEVEL INDICATOR: Indicates audio modulation level of the transmitter signal. (Not affected by the setting of the AF Level control.)
5. TUNER "B" OPERATION INDICATOR: Same as #3.
6. RF SIGNAL LEVEL INDICATOR FOR "B" TUNER: Same as #2.
7. AF LEVEL CONTROL: Adjusts output level at both audio output jacks.
8. MOUNTING ADAPTERS: For mounting the receiver in any standard 19" rack. Attach to receiver with screws supplied.

Rear Panel Controls and Functions (Fig. D)

9. TUNER "B" ANTENNA JACK: Antenna connector for tuner "B." Attach the antenna directly, or extend it with an antenna cable.
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.
11. UNBALANCED OUTPUT JACK: 1/4" phone jack. Can be connected to an unbalanced instrument-level input of a mixer/amp or tape recorder.
12. SQUELCH CONTROL: Adjusts level of noise-muting circuit.
13. DC POWER INPUT: For an external 12-18V DC source. (Requires 300 mA.)
14. AC POWER: Input for 120V AC power.
15. FUSE: AC power fuse, 0.5A fast-blow only.
16. TUNER "A" ANTENNA JACK: Same as #9.

Battery Selection

An alkaline 9-volt battery is recommended.

ATW-T31 UniPak Transmitter Battery Installation:

1. Remove the transmitter from its soft case or clip-on pouch (Fig. E).
2. Slide off the battery cover (Fig. F) and insert a 9V battery, observing correct polarity.
3. Replace the compartment cover as shown in Figure F, making certain the cover slides in the provided grooves and closes snugly.
4. Place the transmitter back in its case.

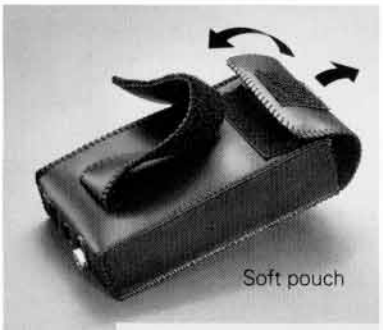


Fig. E

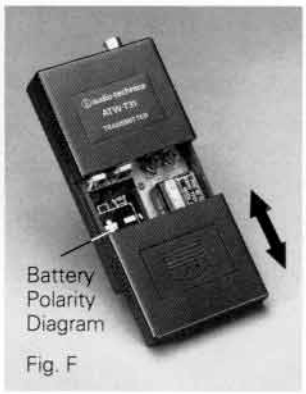


Fig. F

ATW-T32 Hand-held Transmitter Battery Installation:

1. While holding the microphone body normally, unscrew the battery cover (bottom 2½" section) as shown in Figure G.
2. Insert the battery, observing proper polarity (Fig. H).
3. Reinstall the battery cover. ***Do not overtighten.***

Fig. G

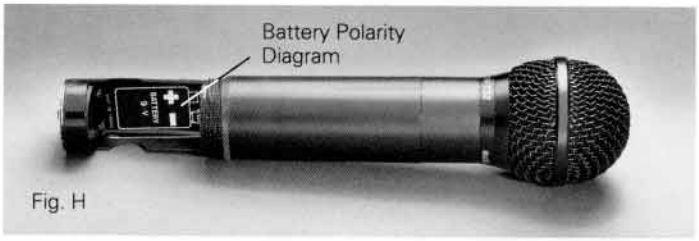


Fig. H

Battery Condition Indicator

After the battery is installed, turn the power on. If the battery indicator LED (Fig. I/J) gives a flash, the battery is functioning normally. If there is no flash at turn-on, either the battery is installed incorrectly or the battery is dead. (Both transmitters are protected against damage resulting from installing the battery backwards.)

If the indicator ***stays*** on (does not flash), the battery is low and should be replaced. If the low-battery indication comes on during use, replace the battery immediately to assure continued operation.

Fig. I ATW-T31

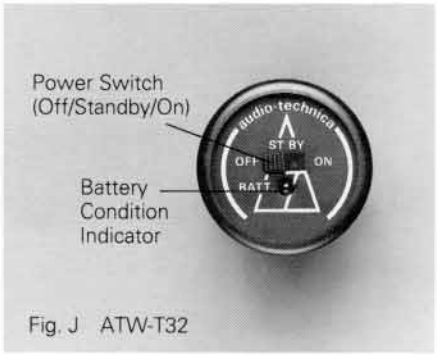


Fig. J ATW-T32

ATW-T31 UniPak Transmitter Input Connections

The ATW-T31 transmitter is supplied with a Hi-Z input cable for use with guitars or other high-impedance sources.

An optional Lo-Z input cable, Model XLRW, is available from your dealer to permit use of any standard low-impedance microphone having an XLRM-type output connector.

In addition, a number of Audio-Technica professional self-polarized condenser microphones are available in versions preterminated with a UniPak input connector:

AT803cW	Ultraminiature omnidirectional condenser lavalier
AT829cW	Miniature cardioid condenser lavalier
AT831cW	Miniature cardioid condenser lavalier
AT851cW	Miniature unidirectional condenser boundary microphone
AT857AMLcW	19" gooseneck cardioid condenser podium microphone
ATM35cW	High-intensity miniature condenser instrument microphone
ATM71cW	Head-worn cardioid condenser microphone
ATM73cW	Head-worn cardioid condenser microphone
MT830cW	Subminiature omnidirectional condenser lavalier

Separate UniPak input connectors, along with full wiring details, are available from the A-T service department. Due to the small size and difficult assembly of this connector, however, we recommend that self-installation be attempted only by the technically proficient. Incorrect connector wiring may result in damage to the transmitter or input source.

System Operation

Turn down the volume of the receiver as well as the mixer, then switch on the receiver. Do ***not*** switch on the transmitter yet.

Receiver On...

The power LED will light up. Even though the transmitter is not on, LED's A or B or the RF level LED's may light if there is high RF interference in the area, or a nearby TV station is on the same frequency. Check the frequency of the system against the chart on page 7 to insure you have a proper frequency for your area. Frequencies are shown on the back panel of the receiver and in the battery compartment of the transmitters.

Transmitter On...

When the transmitter is switched on and in normal operation, one of the diversity indicator LED's, A or B, will light and the receiver's RF signal level indicators will light up from left to right. For optimum operation at least four and preferably five of the signal strength LED's should light up when the transmitter is switched on.

The power switches of transmitters have three positions. When the transmitter is switched to "Standby," the transmitter has just RF output without audio signal. When the transmitter is switched to "On," the microphone is in normal operation and the transmitter will have audio signal output.

When the transmitter is switched "Off" there is minimum receiver noise output due to a special A-T muting system.

Receiver Squelch

The squelch control on the back panel of the receiver is preset at the factory, but can be adjusted if you must use the system in a high RF interference area. If there is audio output from the receiver when ***your*** transmitter is ***off***, adjust the squelch control so the system will receive the signal from ***your*** transmitter but "squelch" or eliminate the unwanted background RF noise. This adjustment can cause a reduction in usable range of the wireless transmitter, so set the control to the ***lowest*** position which reliably mutes the unwanted RF signals.

UniPak Input Level Adjustment

Internal trimmer adjustments in the ATW-T31 (Fig. K) will enable you to use microphones of differing output levels or guitars that have built-in pre-amps. To adjust microphone (Lo-Z) input levels, turn the "MT" (mike trimmer) control to the full counterclockwise position. Plug in the mike and power up the system. Increase the adjustment until the ***maximum*** audio output of the mike will read about three or four LED units on the receiver's AF Level indicator. Do ***not*** set the level so high that the red LED lights. At normal audio levels, only the first one or two LED's ("–15" and "–7" should light.

Follow the same procedure when using the guitar (Hi-Z) input, adjusting the "GT" (guitar trimmer) control to set the transmitter's audio input level.

CAUTION! The small trimmer controls are ***delicate;*** use only a small screwdriver or alignment tool with a maximum 1/8"-wide blade. Do ***not*** force the trimmers beyond their normal 180° range of rotation.

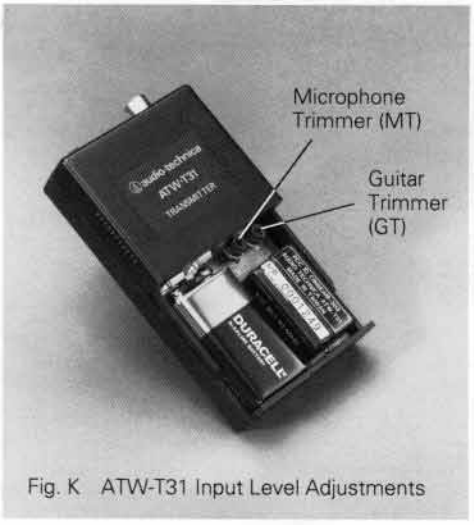


Fig. K ATW-T31 Input Level Adjustments

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 transmitter. Line-of-sight is best.
3. The transmitter and the receiver should be as close together as conveniently possible.
4. Do not place the receiver antenna within three feet of another receiver or antenna.
5. The receiver antennas should be kept away from any metal.
6. A receiver cannot receive signals from two transmitters at the same 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. For best operation, all the RF Level LED's should be lit (maximize RF input); but only the first two or three AF Level LED's should be lit (don't overmodulate).
9. If the AF Level control of the receiver is set too high it may over-drive the input of the mixer, 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 such that the highest sound pressure level going into the microphone 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.
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.

Specifications†

OVERALL SYSTEM

Carrier Frequency Range	VHF high band, 169 to 216 MHz
Frequency Stability	±0.005%, crystal controlled
Modulation Mode	FM
Maximum Deviation Range	±15 kHz, with limiting compressor
Operating Range	Up to 1,500 feet (optimum conditions)
Operating Temperature Range	40°F to 110°F

ATW-R10 RECEIVER

Receiving System	Dual independent receivers, automatic switching diversity reception
Image Rejection	60 dB minimum
De-emphasis	50 µs
Signal-to-noise Ratio	95 dB (1000 µV, 1 kHz, IEC-weighted)
Total Harmonic Distortion	Less than 0.5% (1 kHz, 10 kHz deviation)
Maximum Audio Output	0.4V unbalanced; 0.1V balanced, 600 ohm load (10 kHz deviation)
Output Connectors	Unbalanced: 1/4" phone jack; balanced: XLRM-type
Power Supply	120V AC 60 Hz, 10 W; or 12-18V DC, 300 mA, with external supply
Dimensions	16 1/2" W x 1 3/4" H x 7 1/4" D (19" W with rack mount adapters)
Accessories Included	Two whip antennas, 1/4" - 1/4" output cable, rack mount adapters

ATW-T31 UNIPAK™ TRANSMITTER

RF Power Output	30 mW
Spurious Emissions	40 dB below carrier level minimum, 50 dB typical
Pre-emphasis	50 µs
Signal-to-noise Ratio	95 dB (10 kHz deviation, 1 kHz modulation, IEC-weighted)
Dynamic Range	100 dB minimum (5% distortion)
Input Connections	High impedance, low impedance, bias
Battery	9V battery (NEDA type 1604) alkaline, not included
Current Consumption	35 mA typical
Battery Life	Approximately 10 hours
Dimensions	4 1/2" L x 2 1/2" W x 7/8" H
Net Weight	3.2 oz without battery or case
Accessories Included	Hi-Z input cable; soft vinyl case, ATW-VP10 clip-on pouch

HAND-HELD TRANSMITTERS	ATW-T32	ATW-T32-HE	ATW-T32-C
RF Power Output	30 mW	30 mW	30 mW
Spurious Emissions	40 dB below carrier level minimum, 50 dB typical	40 dB below carrier level minimum, 50 dB typical	40 dB below carrier level minimum, 50 dB typical
Pre-emphasis	50 µs	50 µs	50 µs
Signal-to-noise Ratio	95 dB (10 kHz deviation, 1 kHz modulation, IEC-weighted)	95 dB (10 kHz deviation, 1 kHz modulation, IEC-weighted)	90 dB (10 kHz deviation, 1 kHz modulation, IEC-weighted)
Dynamic Range	100 dB minimum (5% distortion)	100 dB minimum (5% distortion)	100 dB minimum (5% distortion)
Microphone Element	Audio-Technica dynamic	Audio-Technica Hi-Energy™ dynamic	Audio-Technica condenser
Battery	9V battery (NEDA type 1604) alkaline, not included	9V battery (NEDA type 1604) alkaline, not included	9V battery (NEDA type 1604) alkaline, not included
Current Consumption	35 mA typical	35 mA typical	35 mA typical
Battery Life	Approximately 10 hours	Approximately 10 hours	Approximately 10 hours
Dimensions	1 1/2" diameter, 9" long	1 1/2" diameter, 9" long	1 1/2" diameter, 9" long
Net Weight (without battery)	9.2 oz	9.1 oz	8.8 oz
Accessory Included	Stand clamp	Stand clamp	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.

Optional System Accessories

MICROPHONES AND CABLES

AT803cW	AT803b ultraminiature omnidirectional condenser microphone head only, terminated for use with ATW-T31. Includes clothing clip and windscreen.
AT829cW	AT829 miniature cardioid condenser microphone head only, terminated for use with ATW-T31. Includes clothing clip.
AT831cW	AT831b miniature cardioid condenser microphone head only, terminated for use with ATW-T31. Includes clothing clip and windscreen.
AT851cW	AT851a surface-mounted wide-range hemi-cardioid condenser microphone. Ideal for high-quality sound reinforcement and teleconference applications where minimum visibility is required. The cable is terminated for use with ATW-T31.
AT857AMLcW	AT857AMLa 19" gooseneck cardioid microphone only, terminated for use with ATW-T31. Mounts to 5/8"-27 thread. Includes windscreen.
ATM35cW	ATM35 wide-range miniature cardioid condenser microphone. Uniquely capable of picking up high-intensity sound without distortion. The cable is terminated for use with ATW-T31. Includes UniMount™ microphone instrument mount.
ATM71cW	ATM71 head-worn miniature cardioid condenser microphone. The microphone element is positioned for conventional close-range pick-up in front of the mouth. The cable is terminated for use with ATW-T31.
ATM73cW	ATM73a head-worn cardioid condenser microphone, frequency-contoured and terminated for use with ATW-T31. Includes windscreen.
MT830cW	MT830R subminiature omnidirectional condenser microphone head only, terminated for use with ATW-T31. Includes clothing clip and windscreen.
XLRW	Connecting cable for ATW-T31 with an XLRF-type input connector, for Lo-Z microphones with XLRM-type output terminations.

RECEIVING ACCESSORIES

ATW-A10	Pair of ground-plane antennas with 5/8"-27 thread for mounting to mike stands, etc. Takes RF cables with PL259 connectors, not included.
ATW-D10	Antenna divider provides two "1-in, 4-out" amplifier/splitters, connects a pair of antennas to as many as four ATW-R10 diversity receivers. Includes eight output cables, and two six foot antenna input cables.
ATW-RA15	Rack-mount adapters with RF connectors bring antenna inputs to the front of ATW-R10 receiver for ease of setup, or when receiver is enclosed in a metal rack.

Wireless Operating Frequencies

Frequency Selection

Each transmitter/receiver system operates on a single factory-aligned, crystal-controlled frequency. Available frequencies are shown in the chart below.

Operating frequency is specified by a two- or three- character code, such as "T2" or "11U," in addition to the actual frequency in MHz. Both numbers appear inside the battery compartment of the transmitter, on the back of the receiver and on the outer carton. For future reference, please record them in the space provided below.

Because most of these authorized frequencies are shared with TV broadcasting, frequency selection is largely dependent upon which TV broadcast channels are in operation ***where the wireless system is to be used.***

RF Interference

If you encounter receiving interference (from other than an operating TV station), often it can be overcome by adjusting the receiver's squelch control, as described on page 5.

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 A-T professional division.

Audio-Technica Wireless Operating Frequencies

Application	Freq. Code	Freq. (MHz)
• Traveling frequencies: (Normally work anywhere in the U.S.A., but as a result tend to be crowded.)	T2 T3 T8	169.505 170.245 171.905
• For use only where there is no TV Channel 7:	7B 7C	174.800 175.000
• For use only where there is no TV Channel 8:	8A 8R	180.600 184.000
• For use only where there is no TV Channel 10:	10K 10N	194.600 195.400
• For use only where there is no TV Channel 11:	11U 11Z	202.400 203.400
• For use only where there is no TV Channel 12:	12J 12S	206.400 208.200
• For use only where there is no TV Channel 13:	13C 13N	211.000 213.400

Multi-channel Systems

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

- For use where TV channels 7, 9, 11 and/or 13 are operating: 8A-8R-10K-10N-12J-12S
- For use where TV channels 8, 10 and/or 12 are operating: 7B-7C-11U-11Z-13C-13N

Traveling frequencies T2, T3 and/or T8 also may be used with either of the above frequency groups for even larger systems.

For future reference, please record your system information here:

Operating Frequency

Freq. Code ____ ____ ____ Frequency ____ ____ ____ • ____ ____ ____ MHz

Receiver

Model ATW-R10 Serial Number ____ ____ ____ ____ ____ ____ ____

Transmitter

Model ATW-T ____ ____ .... Serial Number ____ ____ ____ ____ ____ ____ ____

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 serial number.

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., contact your local dealer for warranty details.

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