

3000 Series Professional UHF Wireless Systems

ATW-3110 UniPak™ Transmitter System

ATW-3141 Handheld Dynamic Microphone System

Installation and Operation

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.

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 3000 Series wireless system provides a choice of 200 PLL-synthesized UHF frequencies in the 655.500-680.375 MHz band (TV channels 44-49), indicated by the "D" designation at the end of the model numbers on the packaging. Each wireless system includes a receiver and either a body-pack or handheld transmitter. Individual components are also available separately.

All 3000 Series components feature soft-touch controls for quick, easy access to a formidable range of functions; an LCD information display in each unit provides convenient visual indication of unit settings and operation.

The ATW-R310 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. Soft-touch controls provide convenient access to a variety of functions, while an LCD information display provides constant monitoring of system operation, including indication of the transmitter's battery status. The receiver is half-width for a standard 1U 19" rack mount; rack-mount adapters are included. Two receivers can be mounted side by side, using an optional AT8630 joining-plate kit.

The versatile ATW-T310 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. In addition to its programmable functions, the transmitter features a three-position sliding cover to limit access, if desired, to just the Power/Mute button, or to no controls, as appropriate for the application and user.

The ATW-T341 handheld dynamic microphone/transmitter features the same element used in the Artist Elite™ AE4100 dynamic handheld microphone created for professional live-sound venues.

Transmitters in the 3000 Series use two 1.5V AA batteries for economical operation and wide availability. The receiver and both transmitters have "fuel gauge" battery condition indicators with low-battery warnings.

An advanced Digital Tone Lock™ tone squelch system in the ATW-R310 receiver opens only when a 3000 Series transmitter is detected, reducing the possibility of interference. As a result, 3000 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 frequency for each input desired (only one transmitter for each receiver).

Because the wireless frequencies are within UHF TV frequency bands, only certain operating frequencies may be useable in a particular geographic area. Also, only certain of the available operating frequencies may be used together. Operating frequencies and multi-channel suggestions will be found on page 12.

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.

Output Connections

There are two audio outputs on the back panel: balanced (32 mV) and unbalanced (50 mV). 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. The two isolated audio outputs permit simultaneous feeds to both unbalanced and balanced inputs. For example, both a guitar amp and a mixer can be driven by the receiver.

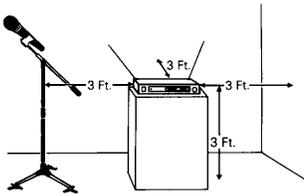


Figure A

Antennas

Attach the included pair of UHF antennas to the antenna input jacks. The antennas are normally positioned in the shape of a "V" (both 45° from vertical) for best reception.

Antennas can be remotely located from the receiver. However, due to signal loss in cables at UHF frequencies, use the lowest-loss RF cables practical for any cable runs over 25 feet. RG8-type is a good choice. Use only copper-shielded cable, not CATV-type foil-shielded wire. Audio-Technica offers quality RF cables in four lengths, as well as remote antennas; see the Optional System Accessories section on page 11.

Power Connections

Connect the included AD1205AA in-line AC adapter to the DC power input on the back of the receiver. Loop the small cord from the DC plug over the cord hook above the jack, to keep the plug from being detached by an accidental tug on the cord. Then plug the larger cord from the in-line adapter into a standard 120 Volt 60 Hz AC power outlet. Operation of the receiver is controlled by the front-panel Power switch.

(Note: Units supplied to countries with 230V mains should include an in-line AC adapter appropriate for that country. *Use the AD1205AA adapter only with 120V 60 Hz AC power sources.*)

Receiver Controls and Functions

Front Panel Controls and Functions (Fig. B)

1. POWER SWITCH: Press Power switch in and the receiver readouts will light.
2. ALERT INDICATOR: The Alert Indicator lights:
 - (a) When the receiver is in the Function Edit mode,
 - (b) When no RF signal is received from transmitter,
 - (c) When only one or two *RF* signal-strength bars are on,
 - (d) When the transmitter is in the Mute mode,
 - (e) When audio modulation level from the transmitter is close to the clipping point (*AF* +3/+6 bars),
 - (f) When only one bar of the Battery "fuel gauge" is on (transmitter battery is weak).
3. LCD WINDOW: Liquid Crystal Display indicates control settings and operational readings. See Figure D on page 16 for examples.
4. TUNER OPERATION INDICATOR: Indicates which Tuner (A or B) has the better reception and is in operation. The "B" indicator also lights to serve as confirmation of Mode/Set button entries.
5. UP/DOWN BUTTONS: Press Up or Down arrow buttons, in conjunction with the Mode/Set button, to step through menus, select operating frequency and edit receiver function choices.
6. MODE/SET BUTTON: Use in conjunction with the Up/Down arrow buttons to step through menus, choose operating frequency and select receiver function options.
7. MOUNTING ADAPTERS: For mounting the receiver in any standard 19" rack. Attach adapters to the receiver with the screws supplied and remove the four receiver feet. (Use optional AT8630 joining-plate kit to mount two ATW-R310 receivers side-by-side.)

Rear Panel Controls and Functions (Fig. C)

8. ANTENNA INPUT JACK: BNC-type antenna connector for Tuner "B." Attach the antenna directly, or extend it with a low-loss antenna cable. See the "Antennas" section on page 3 for more details.
9. ANTENNA INPUT JACK: Input for Tuner "A." Attach the antenna directly, or extend it with a low-loss antenna cable.
10. AF LEVEL CONTROL: Adjusts audio output level of both AF Output jacks; maximum output is fully clockwise.
11. GROUND LIFT SWITCH: Disconnects the ground pin of the balanced output jack (12) from ground. Normally, the switch should be to the left (ground connected). If hum caused by a ground loop occurs, slide switch to the right (ground lifted).
12. 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.
13. 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.
14. POWER INPUT JACK: Connect the DC plug from the included in-line AC adapter.
15. CORD HOOK: Loop the small DC cord around the cord hook to keep the DC plug from pulling out accidentally.

Power On/Off

To turn the receiver on, press in the Power switch. The Alert light and the LCD window will come on (about 1-2 seconds). The operating frequency will be displayed in the window after the power-up sequence. To turn the receiver off, press the Power switch again.

LCD Window

The LCD (Liquid Crystal Display) presents a great deal of setup and operating information clearly and conveniently. (See Figure D for examples.)

Up/Down Arrow Buttons

In conjunction with the Mode/Set button, the arrow buttons permit moving through the menu of functions, and choice of settings within each function.

Mode/Set Button

The Mode/Set button shifts the receiver from normal operation into Menu mode and, in conjunction with the Up/Down arrow buttons, permits selection of different features and changing of their stored values in the Edit mode.

How to Make Setting Changes

1. From the normal operating mode, press the Mode/Set button **once** to enter the Function Menu mode. (Only the frequency will remain in the LCD window, and the receiver's audio output will be cut off.)
2. Use the Up/Down arrow buttons to reach the desired function. The value in the LCD window is the current setting for that function.
3. Press the Mode/Set button once again to open the list of available choices for that function. The value will flash, indicating that it can be changed (Edit mode).
4. Use the arrow buttons to go through the available choices, stopping on the desired new choice.
5. (a) To accept and enter the new choice, **press and hold** the Mode/Set button until "STORED" appears in the LCD. This changes the value and puts the function of the buttons back at Menu level (step 2 above). (The "B" tuner light will come on while the Mode/Set button is depressed, to confirm its action.)

(b) To "back out" of the Edit mode without making a new choice, simply press the Mode/Set button **once**. The word "ESCAPE" will appear in the window and the function of the buttons will revert to the Menu level (step 2 above), without making any changes.
6. Repeat this selection process for any other function changes desired. When finished with any changes, use the arrow buttons to move to "QUIT". Press the Mode/Set button **once** to exit the menu and return the receiver to normal operation. ("RF" and "AF" will reappear in the window, indicating the return to normal receiver operation, with the receiver's audio output again enabled.)

How to Restore Default Settings

To return **all** the receiver functions to their original factory-default settings, first turn the receiver off. Then **hold in the Mode/Set button** while pressing the Power switch. The LCD will briefly show "RESET", followed by "WAIT" (release the Mode/Set button), before commencing normal-mode operation at the default settings.

When the receiver is in the Menu or Edit mode, its audio output is silenced. Once control-setting operations are completed (or Escape is used), normal receiver operation will resume with its audio output restored.

While in the Edit mode, if no action is taken for approximately 30 seconds (no buttons pressed), the receiver will "back out" to the Menu mode. Similarly, after about 30 seconds of inaction in the Menu mode, the receiver will "back out" to normal receiver operation with audio output restored.

High-pass Filter

Internal high-pass filter circuitry may be set to four positions: High-pass Off, or a 6 dB, 12 dB or 18 dB slope at 150 Hz. The default setting is Off ("HP OFF"). Increasing the slope of the high-pass filter further suppresses unwanted low frequencies, while maintaining the frequency response in the desired audio range.

Meter Hold Setting

When activated ("MH ON"), this function permits the bar-meters in the LCD window to capture and display the *highest*-level "AF" audio modulation (a solid bar) and the *lowest*-level "RF" signal (a flashing bar) received from the transmitter. This is particularly useful when setting up the system initially, during a sound-check, or when diagnosing operating problems. The default setting is Off ("MH OFF").

When the Meter Hold is On, it is possible to reset it – to obtain a new set of RF and AF readings – without turning it off-and-on using the Menu/Edit functions. Simply press the transmitter's Power/Mute button once (to mute the transmitter) and *wait until the receiver's Alert light comes on*, indicating the Mute condition. Then press the transmitter's Power/Mute button once again, to un-mute the transmitter. *After the Alert light goes out*, a new set of min/max RF/AF readings will be indicated on the bar-meters. (Note that, depending upon the digital updating-and-confirming sequence of the Mute condition data from the transmitter, it may take several seconds for the Alert light condition to change. **The Meter Hold function is not reset until the Alert light has turned on, then turned off.**)

Digital Tone Lock™ Squelch

The 3000 Series employs a unique Digital Tone Lock squelch system that provides enhanced rejection of interference. In addition to providing highly effective control of unwanted noise, the Tone Lock signal from the transmitter also conveys data on the transmitter's battery condition and mute status back to the receiver for display.

The squelch level is adjustable from 15 dB (the default value) to 42 dB in 3 dB steps. Increasing the squelch level – also called "tightening the squelch" – can cause a reduction in useable range of the wireless transmitter, so use the lowest value that reliably mutes the unwanted RF signals. (If interference is a problem, first consider trying a different frequency.)

Receiver Functions			
<u>Function Menu</u>	<u>Default Setting*</u>	<u>Choices (Edit) ▲▼</u>	<u>Wrap-around**</u>
(Receiver powers-up at Frequency)			
▲▼ Frequency	Lowest in band†	200 discrete frequencies	Yes
▲▼ Quit (exit Menu)	QUIT	Press Mode/Set to exit	–
▲▼ Squelch	SQ 15 dB	SQ 15 dB to SQ 42 dB in 3 dB steps	No
▲▼ Meter Hold	MH OFF	MH OFF MH ON	Yes
▲▼ High-pass Filter	HP OFF	HP OFF HP -6 HP -12 HP -18	No
* To reset to Default values, hold in the Mode/Set button while pressing the Power button to turn on the unit.			
** Continue in the same Up/Down direction and choices "wrap around" to the other end of the range.			
† 655.500 MHz			

Table 1. Receiver Functions

Transmitter Controls And Functions

Refer to Figures E, F, G and H for an overview of transmitter features and controls.

LCD Window

The Liquid Crystal Display presents a great deal of setup and operating information clearly and conveniently (See examples in Fig. J). The LCD in the transmitters is designed for greatest contrast and best viewing with the window rotated somewhat **away** from the viewer (about 30 degrees), not straight-on, for a more convenient holding/viewing position.

Power/Mute Button

The transmitters have a combination Power and Mute switch. When used in combination with the programmed choices explained below, the various functions available to the transmitter user may be tailored to fit personal preferences or particular situations of use.

Power On/Off

To turn the transmitter on, **press and hold** the Power/Mute button until the red power indicator and the LCD window come on (about 1-2 seconds). The operating frequency will show in the window after the power-up sequence.

To turn the transmitter off, **press and hold** the Power/Mute button again, until the red power indicator and the LCD window are extinguished (about 1-2 seconds). The LCD window will show "*PWR.OFF*" before shutdown.

Mute Off/On

When the transmitter is muted, it produces RF with no audio signal modulation. When the transmitter is un-muted, it produces both RF and audio.

To mute the transmitter (cut off the audio, but continue the RF output), **press and release** the Power/Mute button **once**. A small "*MUTE*" will appear in the LCD window, just below the frequency (Fig. J-2).

To un-mute the transmitter (restore the audio), **press and release** the Power/Mute button **once** again. The "*MUTE*" will disappear from the LCD window.

Power/Mute Locks

Programmable Power/Mute Locks limit the functioning of the Power/Mute button as desired for particular users and/or applications. Power can be locked On; Mute can be locked Off. Selection of the desired locks, if any, is made through the function menu:

Setting	Description
<i>NO.LOC</i>	The normal Power and Mute functions are fully operational.
<i>ALL.LOC</i>	Both the Power and Mute functions are locked into their status as of the time " <i>ALL.LOC</i> " is applied. (Power On, and Mute either On or Off.) Note: <i>ALL.LOC</i> must be re-accessed and the setting changed to turn the transmitter off.
<i>MUT.LOC</i>	In this mode, the audio cannot be muted. The Power functioning is unaffected. (If <i>MUT.LOC</i> is applied while the transmitter is muted, pressing the Power/Mute button once will return to un-muted operation; thereafter the Mute function is disabled until the setting is changed again.)

PWR.LOC Power is locked On as of the time "*PWR.LOC*" is applied. The Mute functioning is unaffected. Note: When in the *PWR.LOC* mode, the transmitter may be turned off by: (1) Re-accessing the *.LOC* Menu and changing the setting, or (2) Removing and re-installing the batteries. When the transmitter is turned on again, it will power-up in the *NO.LOC* mode. (Only the *PWR.LOC* function will change when batteries are removed; all other settings remain stored in memory.)

If an attempt is made to take an action that currently is locked out, the LCD will display "*LOC.KED*" briefly, then return to its previously-displayed contents.

Audio Input Selector

The UniPak™ body-pack transmitter provides input connections for both low-impedance (Lo-Z) microphones and high-impedance (Hi-Z) instruments. A wide range of Audio-Technica Wireless Essentials™ microphones and cables is available pre-terminated with the appropriate professional latching connector. (See page 11.)

Selection of the desired input – microphone or instrument – is made through the function menu. Depending upon the input selected, a small "*MIC*" or "*INST*" will show in the LCD window, just below the frequency. (In the handheld transmitter, only "*MIC*" will show in the LCD window.)

Setting Audio Input Level

A 4-position audio input gain setting, selected through the function menu, serves to match the audio input level to the transmitter for best modulation with minimum distortion.

Available choices are +12 dB, +6 dB, 0 dB and –6 dB. The default value is +6 dB. Select the highest setting that does not result in over-modulation with the highest audio/instrument input levels (an AF indication on the receiver no higher than "0"); watch the receiver's "*AF*" meter "+3/+6" indications and the Alert light to make certain they are not triggered by the highest audio levels.

The transmitter's normally-on red LED power indicator will blink **off** if the peak audio input exceeds the maximum desirable level.

Restore Default Settings

A "*PRESET*" selection in the menu permits resetting of all transmitter functions to their factory-default values.

1. Press the Set button once to move to Menu mode.
2. Press the Up arrow twice to move to "*PRESET*" in the LCD window.
3. Press the Set button once and "*LOAD*" will appear in the LCD.
4. **Press and hold** the Set button until "*DEF*" appears in the LCD.
5. **Press and hold** the Set button until "*LOADED*" appears briefly in the LCD. The window will then revert to "*PRESET*".
6. Press the Down arrow once to move to "*QUIT*".
7. Press the Set button once to exit the Menu mode and return to normal operation, with all factory-default settings restored.

Transmitter Controls And Functions *(Continued)*

UniPak Transmitter Functions

<u>Function Menu</u>	<u>Default Setting</u>	<u>Choices (Edit) ▲▼</u>	<u>Wrap-around**</u>
(Transmitter powers-up at Frequency)			
▲▼ Frequency	Lowest in band†	200 discrete frequencies	Yes
▲▼ RF Power	<i>RF LOW</i>	<i>RF LOW RF HI</i>	Yes
▲▼ Audio Input Level	<i>+6 dB</i>	<i>-6 dB 0 dB +6 dB +12 dB</i>	No
▲▼ Power/Mute Locks	<i>NO.LOC</i>	<i>NO.LOC ALL.LOC MUT.LOC PWR.LOC</i>	Yes
▲▼ Input Select	<i>MIC</i>	<i>MIC INSTR</i>	Yes
▲▼ Reset to Defaults	<i>PRESET</i>	<i>LOAD (b) hold until: DEF (c) hold until: LOADED</i>	--
▲▼ Quit (exit Menu)	<i>QUIT</i>	Press Set to exit	--

** Continue in the same Up/Down direction and choices "wrap around" to the other end of the range.

† 655.500 MHz

Table 2. UniPak Transmitter Functions

Handheld Transmitter Functions

<u>Function Menu</u>	<u>Default Setting</u>	<u>Choices (Edit) ▲▼</u>	<u>Wrap-around**</u>
(Transmitter powers-up at Frequency)			
▲▼ Frequency	Lowest in band†	200 discrete frequencies	Yes
▲▼ RF Power	<i>RF LOW</i>	<i>RF LOW RF HI</i>	Yes
▲▼ Audio Input Level	<i>+6 dB</i>	<i>-6 dB 0 dB +6 dB +12 dB</i>	No
▲▼ Power/Mute Locks	<i>NO.LOC</i>	<i>NO.LOC ALL.LOC MUT.LOC PWR.LOC</i>	Yes
▲▼ Reset to Defaults	<i>PRESET</i>	<i>LOAD (b) hold until: DEF (c) hold until: LOADED</i>	--
▲▼ Quit (exit Menu)	<i>QUIT</i>	Press Set to exit	--

** Continue in the same Up/Down direction and choices "wrap around" to the other end of the range.

† 655.500 MHz

Table 3. Handheld Transmitter Functions

Battery Selection and Installation

Each transmitter uses two 1.5V AA batteries, not included. Alkaline type is recommended. Always replace both batteries. **Make certain the transmitter power is Off before replacing batteries.**

UniPak™ Transmitter Battery Installation

1. Open the battery compartment door by sliding the catch down (Fig. K). (If no batteries are inside, the door will not spring open by itself.)
2. **Observe correct polarity as marked on the metal contacts on the door** and carefully insert two fresh 1.5V AA alkaline batteries (Fig. L).
3. Close the door, making certain the latch clicks securely in place.

Handheld Transmitter Battery Installation

1. While holding the lower body cover (near the LCD window), grasp the upper part of the transmitter body just **below** the grille and unscrew it at least four complete turns (Fig. G); then slide the lower body cover down until it stops (Fig. H). Once the cover has been lowered, turn the transmitter over to reveal the battery compartment on the side opposite the LCD window.
2. **Observe correct polarity as marked inside the battery compartment** and carefully insert two fresh 1.5V AA alkaline batteries (Fig. M). Insert the first battery and slide it down. Then insert the second battery, bottom first, into the space remaining. Make certain the batteries are fully seated in the battery compartment.
3. Slide the lower body cover back up the body, then screw the housing together. **Do not overtighten.**

Note: Remove batteries from the handheld transmitter starting at the **bottom** (– end) of the top battery (Fig. M). The top (+ end) of the top battery is captured in a recess and will not come straight out.

Battery Condition Indicator

After the batteries are installed, turn the power on by **pressing and holding** the Power/Mute button. The small red power-on LED (Fig. E/F) should light and the LCD window should come on. If this does not happen, the batteries are installed incorrectly or they are dead. The transmitter's "fuel gauge" battery indicator displays a maximum of four bar segments. When it flashes "**LOW.BAT**", the batteries should be replaced immediately to ensure continued operation. (The receiver also displays transmitter battery condition in the LCD window with bar segments; the Alert indicator comes on to warn of a low-battery condition.)

UniPak Transmitter Input Connection

Connect an audio input device (microphone or guitar cable) to the audio input jack on the bottom of the transmitter. A number of Audio-Technica professional microphones and cables are available separately, pre-terminated with a UniPak input connector (see "Optional System Accessories" on page 11). The cable connector latches automatically when inserted into the transmitter jack. To unlatch and remove the connector, simply pull up on the connector's knurled metal collar.

UniPak Transmitter Antenna

The UniPak transmitter includes a field-replaceable 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 instrument; or try repositioning the receiver. Since the antenna simply screws in, check it occasionally to make certain it is snugly attached (finger-tight). **Do not change the length of the transmitting antenna.**

Handheld Transmitter Antenna

The antenna for the handheld mic/transmitter is in the black, non-metallic section at the bottom of the unit (Fig. F). For best results, hold the mic/transmitter naturally, around its painted metal case; holding or otherwise covering the antenna housing may affect operating range.

UniPak Transmitter Mounting Clip

The UniPak transmitter's mounting clip may be installed with the case positioned either "up" or "down," depending upon which is preferred for the application. To turn the clip around, spring the ends of the clip out of the two holes on the sides of the transmitter case (Fig. E) and reinstall it facing in the opposite direction.

Switch on the receiver. Do *not* switch on the transmitter yet.

Selecting/Setting Frequency

Selection of the desired operating frequency is made through the function menus. It's usually best to start by setting the receiver's frequency, to determine there is no local interference on that frequency. Then, *always* make certain to set the transmitter to the receiver's *exact* frequency. The receiver's unique Digital Tone Lock system squelches the audio only, permitting any RF energy on the frequency to show on the "RF" bar-meter.

For multi-channel wireless systems, refer to page 12 for suggested frequency combinations. Visit the Audio-Technica Web site (www.audio-technica.com) for extensive wireless information and operating tips.

Receiver On...

The Alert indicator and the LCD window will light up; the normal-operation LCD display will appear after 1-2 seconds (Fig. D-1). If any of the bars show in the "RF" bar-graph meter, there may be RF interference in the area. If this occurs, select another frequency as explained below. (If the Meter Hold function has been selected, one of the RF bars will be flashing, indicating the lowest RF level received.)

Setting Receiver Frequency

1. Press the Mode/Set button once; then only the frequency will appear in the LCD window. (The receiver is now in the Menu mode.) See Figure D-2.
2. Press the Mode/Set button again; the Alert light will come on and the frequency in the window will flash. (The receiver is now in the Edit mode, Fig. D-3.)
3. Use the Up/Down arrow buttons to change the frequency. Press either arrow for single steps, or hold down either arrow for rapid cycling through the band. Frequencies "wrap around" to the other end of the range when the top or bottom of the band is reached. Choose a frequency appropriate for your area, avoiding frequencies with active TV channels. (See the frequency listings on page 12.)
4. To activate this frequency selection, *press and hold* the Mode/Set button until the word "STORED" appears in the receiver's window. (If you do not wish to complete this particular selection, just press the Mode/Set button *once*. The word "ESCAPE" will appear briefly in the window and the receiver will return to the Menu mode.)
5. When finished entering a frequency, press the Down arrow button *once* to move to "QUIT". Then press the Mode/Set button *once* to exit the menu. The "RF" and "AF" scales will reappear in the window, indicating the return to normal operation.

Transmitter On...

Turn on the transmitter by pressing and holding the Power/Mute button (Fig. E/F) for a second or two, until the red power indicator and the LCD window have come on.

Setting Transmitter Frequency

1. Press the Set button once and the small word "MENU" will appear above the frequency. Press the Set button again and the small *flashing* word "EDIT" will appear to the right of "MENU". See Figures J-3 and J-4.

2. Use the Up/Down arrow buttons to change the transmitter frequency. Press either arrow for single steps, or hold down either arrow for rapid cycling through the range. Frequencies "wrap around" when the top or bottom of the band is reached. Select the *exact* frequency displayed on the receiver.
3. To activate this frequency selection, *press and hold* the Set button until the word "STORED" appears in the transmitter's window. (If you do not wish to complete this selection, just press the Set button *once*: the word "ESCAPE" will appear briefly in the window and the transmitter will return to the Menu mode.)
4. When finished entering a frequency, press the Up arrow button *once* to move to "QUIT". Then press the Set button *once* to exit the menu. The word "MENU" in the transmitter window will go off, indicating the return to normal operation.

When the transmitter is switched on and in normal operation, the receiver's "RF" signal-level bars will display from bottom to top, with more bars indicating increased signal reception. For optimum performance at least four, and preferably five or more, of the RF indicators should be displayed.

Setting Levels

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

Set Transmitter Audio Input Level

A 4-position audio input gain setting, selected through the function menu, serves to match the audio input level to the transmitter for best modulation with minimum distortion.

Available choices are +12 dB, +6 dB, 0 dB and -6 dB. The default setting is +6 dB. Select the highest setting that does not result in over-modulation with the highest audio/instrument input levels (an AF indication on the receiver no higher than "0"); watch the receiver's "AF" bar-graph "+3/+6" indications and the Alert light, to make certain that they are not triggered by the highest audio levels.

The transmitter's normally-on red LED power indicator will blink *off* if the peak audio input exceeds the maximum desirable level.

RF Power Adjustment

RF power may be set to "RF HI" (30 mW nominal) or "RF LOW" (10 mW nominal) through the function menu. The default setting is "RF LOW". While the Hi 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.

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.

See pages 16-17 for illustrations.

Specifications[†]

OVERALL SYSTEM

UHF Operating Frequency	655.500 to 680.375 MHz
Number of Channels	200 total
Frequency Stability	±0.005%, Phase Lock Loop frequency control
Modulation Mode	FM
Normal Deviation	±10 kHz
Operating Range	300' typical
Operating Temperature Range	41° F (5° C) to 113° F (45° C)
Frequency Response	70 Hz to 15 kHz

ATW-R310 RECEIVER

Receiving System	Dual independent receivers, automatic-switching diversity
Image Rejection	60 dB nominal, 55 dB minimum
Signal-to-noise Ratio	110 dB at 35 kHz deviation (IEC-weighted), maximum modulation 75 kHz
Total Harmonic Distortion	≤1% (10 kHz deviation at 1 kHz)
Sensitivity	24 dBμV (S/N 60 dB at 5 kHz deviation, IEC-weighted)
Intermediate Frequency	60 MHz, 10.7 MHz
Audio Output	
Unbalanced:	50 mV (at 1 kHz, ±5 kHz deviation, 10k ohm load)
Balanced:	32 mV (at 1 kHz, ±5 kHz deviation, 10k ohm load)
Output Connectors	
Unbalanced:	1/4" TS ("mono") phone jack
Balanced:	XLRM-type
Power Supply	120V AC 60 Hz, or 12-18V DC, 500 mA, center positive, with external supply
Dimensions	8.27" (210.0 mm) W x 1.93" (49.0 mm) H x 6.93" (176.0 mm) D
Weight	2.4 lbs (1.1 kg)
Accessories Included	AD1205AA 120V 60 Hz in-line AC adapter; two flexible UHF antennas; rack-mount adapters

ATW-T310 UNIPAK™ TRANSMITTER

RF Power Output	High: 30 mW; Low: 10 mW, nominal
Spurious Emissions	Under federal regulations
Dynamic Range	≥110 dB, A-weighted
Input Connections	High impedance, low impedance, bias
Batteries (not included)	Two 1.5V AA alkaline
Current Consumption	Hi: 200 mA; Low: 150 mA, typical
Battery Life	Approximately 6 hours (High); 8 hours (Low), depending on battery type and use pattern
Dimensions	2.60" (66.0 mm) W x 3.43" (87.0 mm) H x 0.94" (24.0 mm) D
Net Weight (without batteries)	2.8 oz (80 grams)

ATW-T341 HANDHELD TRANSMITTER

RF Power Output	High: 30 mW; Low: 10 mW, nominal
Spurious Emissions	Under federal regulations
Dynamic Range	≥110 dB, A-weighted
Microphone Element	Dynamic cardioid (unidirectional)
Batteries (not included)	Two 1.5V AA alkaline
Current Consumption	High: 230 mA; Low: 180 mA, typical
Battery Life	Approximately 6 hours (High); 8 hours (Low), depending on battery type and use pattern
Dimensions	9.33" (237.0 mm) long, 1.89" (48.0 mm) diameter
Net Weight (without batteries)	9.9 oz (280 grams)
Accessory Included	AT8456a 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.

Optional System Accessories

WIRELESS ESSENTIALS™ MICROPHONES AND CABLES

All Wireless Essentials accessories are terminated for use with ATW-T310 and other UniPak™ transmitters.

AT829cW	Miniature cardioid condenser lavalier microphone. Includes clothing clip and windscreen.
MT830cW	Subminiature omnidirectional condenser lavalier microphone. Includes clothing clip and windscreen.
MT830cW-TH	"Theater" model, same as MT830cW except beige color mic and cable for concealment.
AT831cW	Miniature cardioid condenser lavalier microphone. Includes clothing clip and windscreen.
AT851cW	Surface-mount wide-range hemi-cardioid condenser microphone.
AT857AMLcW	19" gooseneck cardioid microphone. Mounts to 5/8"-27 thread. Includes windscreen.
AT889cW	Headworn noise-canceling condenser microphone. Includes windscreen and cable clip.
ATM35cW	Cardioid condenser instrument microphone. Includes AT8418 clip-on instrument mount.
ATM73cW	Headworn cardioid condenser microphone. Includes windscreen.
ATM75cW	Headworn cardioid condenser microphone. Includes windscreen.
PRO 8HEcW	Headworn hypercardioid dynamic microphone. Includes windscreen and cable clip.
PRO 35xcW	Cardioid condenser instrument microphone. Includes AT8418 clip-on instrument mount.
AT-GCW	Hi-Z instrument/guitar cable with 1/4" phone plug.
XLRW	Connecting cable for UniPak transmitter with an XLR-type input connector, for Lo-Z microphones with XLRM-type output terminations.

RECEIVER ACCESSORIES

AT8630	Joining-plate kit allows rack-mounting two ATW-R310 receivers side-by-side in a single (1U) 19" rack space.								
ATW-A20	Pair of UHF ground-plane antennas with 5/8"-27 thread for mounting to microphone stands, etc. For use with ATW-R310D (Band D) receivers. Takes RF cables with BNC connectors, not included; see RF Cables below.								
ATW-DA600	UHF (656-680 MHz) active unity-gain antenna distribution system provides two "1-in, 4-out" RF channels; connects a pair of antennas to as many as four diversity receivers. A cascade output is provided as a directional coupler to drive additional distribution amps. Includes four DC interconnect cables to power up to four receivers, eight RF output cables and two rack-mount adapters. Mounts in a single (1U) 19" rack space. For use with ATW-R310D (Band D) receivers.								
ATW-RA1	Rack-mount antenna kit brings antenna inputs to the front of receiver for ease of setup, or when receiver is enclosed in a metal rack. Includes a pair of extendible antennas. NOTE: Two adapter kits are required when mounting two receivers side-by-side in a single 19" rack space.								
RF Cables	Low-loss design, 50 ohm impedance, with BNC-to-BNC connectors: <table style="margin-left: 20px;"> <tr> <td>AC12</td> <td>RG58-type cable (12')</td> </tr> <tr> <td>AC25</td> <td>RG8-type cable (25')</td> </tr> <tr> <td>AC50</td> <td>RG8-type cable (50')</td> </tr> <tr> <td>AC100</td> <td>RG8-type cable (100')</td> </tr> </table>	AC12	RG58-type cable (12')	AC25	RG8-type cable (25')	AC50	RG8-type cable (50')	AC100	RG8-type cable (100')
AC12	RG58-type cable (12')								
AC25	RG8-type cable (25')								
AC50	RG8-type cable (50')								
AC100	RG8-type cable (100')								

TRANSMITTER ACCESSORIES

AT8114	Foam windscreen for handheld transmitter.
AT8141	Water-resistant pouch for UniPak transmitter.
AT8390	Shielded audio cable with 1/4" to 1/4" phone plugs. Available in a variety of lengths. (Also available with one straight and one 90° phone plug as the AT8316.)
AT8456a	Stand clamp for handheld transmitter, 5/8"-27 threads.

3000 Series UHF Operating Frequencies

TV Ch.	Band D: 655.500 - 680.375 MHz							
44	---	---	---	---	655.500	655.625	655.750	655.875
45	656.000	656.125	656.250	656.375	656.500	656.625	656.750	656.875
45	657.000	657.125	657.250	657.375	657.500	657.625	657.750	657.875
45	658.000	658.125	658.250	658.375	658.500	658.625	658.750	658.875
45	659.000	659.125	659.250	659.375	659.500	659.625	659.750	659.875
45	660.000	660.125	660.250	660.375	660.500	660.625	660.750	660.875
45	661.000	661.125	661.250	661.375	661.500	661.625	661.750	661.875
46	662.000	662.125	662.250	662.375	662.500	662.625	662.750	662.875
46	663.000	663.125	663.250	663.375	663.500	663.625	663.750	663.875
46	664.000	664.125	664.250	664.375	664.500	664.625	664.750	664.875
46	665.000	665.125	665.250	665.375	665.500	665.625	665.750	665.875
46	666.000	666.125	666.250	666.375	666.500	666.625	666.750	666.875
46	667.000	667.125	667.250	667.375	667.500	667.625	667.750	667.875
47	668.000	668.125	668.250	668.375	668.500	668.625	668.750	668.875
47	669.000	669.125	669.250	669.375	669.500	669.625	669.750	669.875
47	670.000	670.125	670.250	670.375	670.500	670.625	670.750	670.875
47	671.000	671.125	671.250	671.375	671.500	671.625	671.750	671.875
47	672.000	672.125	672.250	672.375	672.500	672.625	672.750	672.875
47	673.000	673.125	673.250	673.375	673.500	673.625	673.750	673.875
48	674.000	674.125	674.250	674.375	674.500	674.625	674.750	674.875
48	675.000	675.125	675.250	675.375	675.500	675.625	675.750	675.875
48	676.000	676.125	676.250	676.375	676.500	676.625	676.750	676.875
48	677.000	677.125	677.250	677.375	677.500	677.625	677.750	677.875
48	678.000	678.125	678.250	678.375	678.500	678.625	678.750	678.875
48	679.000	679.125	679.250	679.375	679.500	679.625	679.750	679.875
49	680.000	680.125	680.250	680.375	---	---	---	---

Multi-channel Operation: Frequencies noted in **Bold** above, and repeated below, may be used in any combination for multi-channel systems, as long as a local TV station is not operating on those frequencies.

TV Ch.	Freq.	For use where TV Ch. 44 is operating	For use where TV Ch. 45 is operating	For use where TV Ch. 46 is operating	For use where TV Ch. 47 is operating	For use where TV Ch. 48 is operating	For use where TV Ch. 49 is operating	Mark for TV stations in your area
44	655.500	NO	✓	✓	✓	✓	✓	
44	655.750	NO	✓	✓	✓	✓	✓	
45	656.000	✓	NO	✓	✓	✓	✓	
45	657.500	✓	NO	✓	✓	✓	✓	
45	657.750	✓	NO	✓	✓	✓	✓	
45	658.000	✓	NO	✓	✓	✓	✓	
45	661.000	✓	NO	✓	✓	✓	✓	
45	661.375	✓	NO	✓	✓	✓	✓	
46	663.000	✓	✓	NO	✓	✓	✓	
46	664.625	✓	✓	NO	✓	✓	✓	
46	665.125	✓	✓	NO	✓	✓	✓	
46	665.625	✓	✓	NO	✓	✓	✓	
47	671.250	✓	✓	✓	NO	✓	✓	
47	672.000	✓	✓	✓	NO	✓	✓	
47	672.375	✓	✓	✓	NO	✓	✓	
47	673.000	✓	✓	✓	NO	✓	✓	
47	673.625	✓	✓	✓	NO	✓	✓	
48	677.875	✓	✓	✓	✓	NO	✓	
48	678.750	✓	✓	✓	✓	NO	✓	
48	679.750	✓	✓	✓	✓	NO	✓	

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 should be as close together as conveniently possible, but no closer than three feet (1 m).
4. Avoid placing the receiver in a low or shielded location where the transmitter and receiver antennas are not visible to each other. If necessary, use remotely-located receiver antennas.
5. Avoid placing the receiver near computers or other RF generating equipment.
6. The receiver and transmitter must be set to the same frequency.
7. A receiver cannot receive signals from two transmitters at the same time.
8. Do not obstruct the handheld transmitter's antenna (located at the base) or attached body-pack transmitter's antenna with your hands.
9. You need to change frequencies 1) when a strong interference signal is received, 2) when audio quality is poor due to weak RF, or 3) during multiple-system operation in order to select an interference-free frequency.
10. Turn the transmitter off when not in use. Remove the batteries if the transmitter is not to be used for a period of time.

For future reference, please record your system information here:

Receiver ATW-R310 S/N _____
Serial Number appears on the FCC label on the bottom of the receiver.

Transmitter ATW-T310 S/N _____
Serial Number appears on the FCC label on the back of the transmitter.

 ATW-T341 S/N _____
Serial Number appears in a recess in the battery compartment of the transmitter.

Receiver is not on (LCD window does not light).

- Receiver Power switch is not pressed in.
- Small DC power cord from included in-line power supply is not plugged into jack on back of receiver. (Use the cord hook to secure it.)
- The in-line power supply is not plugged into AC power outlet.
- AC power is not present at the AC outlet.

Receiver is on (LCD window lights)

• No sound • Alert light is OFF:

✓ “RF”, “AF” and “BATT” legends do not appear in LCD...

- Receiver is in the Menu mode. [See p. 4.]

✓ “RF” and “AF” level meters both show good signals.

- AF Level control on back of receiver not turned up (clockwise). [See p. 4.]
Note: If the “AF” level meter shows a good signal on the receiver when the transmitter is receiving audio input, and the AF Level control is turned up, then the problem is in connections to or control settings on the mixer, amplifier, etc.

✓ Only “RF” level meter shows good signal; no “AF” signal.

- No sound input to mic.
- ATW-T310 body-pack only: Wrong input selected (“INST” or “MIC”). [See p. 6.]

Receiver is on (LCD window lights)

• No sound • Alert light is ON:

✓ “RF”, “AF” and “BATT” legends do not appear in LCD, and LCD is *flashing*...

- Receiver is in the Edit mode. [See p. 4.]

✓ “RF” and “AF” level meters both show good signals.

- The transmitter audio level is too high (“+3”/“+6” on receiver). [See p. 9.]
- Batteries may be weak. (Check “BATT” fuel gauge.)

✓ Only “RF” level meter shows good signal; no “AF” signal.

- Transmitter may be muted. (Note: Normally it takes several seconds for the Alert light to turn off/on after the transmitter mute is switched off/on.) [See p. 5.]

✓ Neither the “RF” nor the “AF” level meter shows any signal.

- Receiver antennas not connected.
- Transmitter is turned off.
- Transmitter is set to a different frequency.
- Transmitter batteries are dead or missing.

Receiver is on (LCD window lights)

• Distorted sound • Alert light is ON:

✓ “RF” and/or “AF” level meters may show good signals.

- The transmitter audio level is too high (“+3”/“+6” on receiver). [See p. 9.]
- Received RF level may be too low (only one or two bars).
- Batteries may be weak; check “BATT” fuel gauge. (Sound may or may not be distorted.)

Momentary loss of sound/noisy sound as transmitter is moved around performing area.

- Transmitter and receiver antennas not in line-of-sight (or perhaps too far apart). Adjust positions of units so they are visible to each other/closer together; use remote antennas located closer to the transmitter location.
- Signal blockage or interference from large metal objects, other wireless units located too close and/or on incompatible frequencies, computer or lighting equipment.
- Squelch setting may be set “tighter” than it needs to be. (Recommended squelch setting is the minimum/default value, 15 dB.) [See p. 5.]
Tip: Use the Meter Hold function to help identify and resolve (or at least avoid) RF problem locations. [See p. 5.]

With transmitter on, received signal is noisy or contains extraneous sounds.

- Batteries may be weak. Check “BATT” fuel gauge and “RF” meter level.
- Local TV transmissions on this frequency.
- Nearby sources of RF interference, such as computers, lighting equipment, etc.
- Two transmitters may be operating on the same frequency. Locate and turn one off or change its frequency.
- In multiple-system use, two (or more) incompatible frequencies may have been selected. Refer to the suggested multi-channel frequency combinations. [See p. 12.]

Troubleshooting's First Line of Defense: Factory-Default Settings

Incorrect settings on the receiver and/or transmitter can make the wireless system's operation seem poor, or even "dead." To eliminate the possibility that incorrect function settings are the source of problems, restore **both the receiver and the transmitter** to their factory-default settings.

RECEIVER – To return **all** receiver functions to their original factory-default settings:

1. First, turn the receiver off.
2. **Hold in the Mode/Set button** while pressing the Power switch to turn the receiver back on. The LCD will briefly show "RESET", followed by "WAIT" (release the Mode/Set button), before commencing normal-mode operation with all factory-default settings restored.
- (3.) (If the default frequency, 655.500 MHz, is not useable in your area, **set both the receiver and the transmitter** to the same suitable frequency.)

TRANSMITTER – To return **all** transmitter functions to their factory-default settings:

1. Press the Set button once to move to Menu mode.
2. Press the Up arrow twice to move to "PRESET" in the LCD window.
3. Press the Set button once and "LOAD" will appear in the LCD.
4. **Press and hold** the Set button until "DEF" appears in the LCD.
5. **Press and hold** the Set button until "LOADED" appears briefly in the LCD. The window will then revert to "PRESET".
6. Press the Down arrow once to move to "QUIT".
7. Press the Set button once to exit the Menu mode and return to normal operation, with all factory-default settings restored.
- (8.) (If the default frequency, 655.500 MHz, is not useable in your area, set **both the receiver and the transmitter** to the same suitable frequency.)

"Alert" Conditions

The red Alert indicator on the receiver signals the user regarding a number of operating conditions.

Transmitter conditions:

- ✓ **No RF** When no RF signal is received from transmitter.
- ✓ **Weak RF** When only one or two "RF" signal-strength bars are on.
- ✓ **Transmitter Muted** When the transmitter is in the Mute* mode.
- ✓ **Transmitter Audio Too High** When audio modulation level from the transmitter is close to the clipping point (AF +3/+6 bars).
- ✓ **Batteries Weak** When only one bar of the Battery* "fuel gauge" is on.

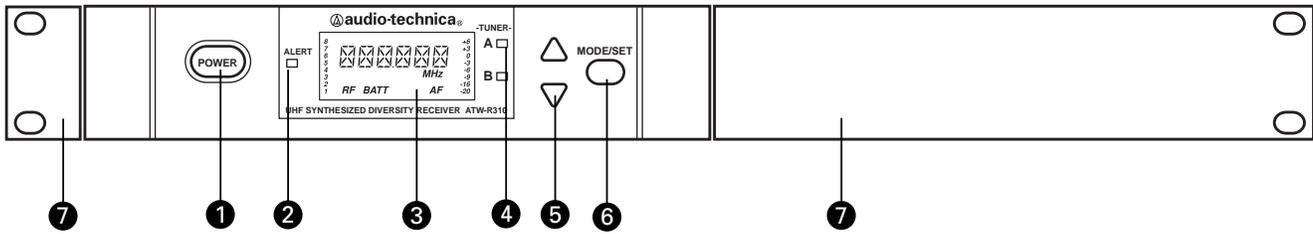
Receiver conditions:

- ✓ **Edit Mode** When the receiver is in the Function Edit mode.

* These functions use digital data supplied from the transmitter. It can take up to several seconds for the receiver display to be "updated" with the latest mute/unmute and battery status information. This is **normal** operation for both the Alert light and the "BATT" indication.

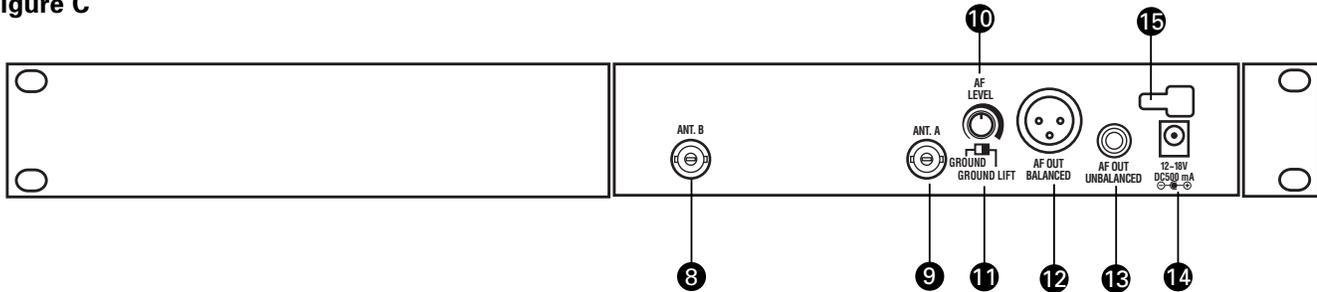
Receiver Front Panel

Figure B



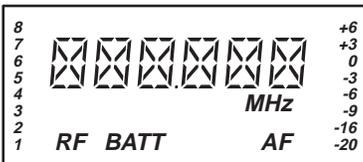
Receiver Rear Panel

Figure C



Receiver LCD Window

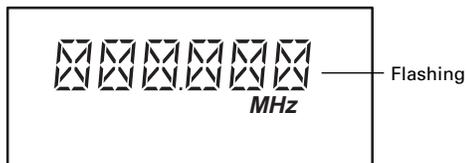
Figure D



D-1. Normal Receiver Operation
(Transmitter off)



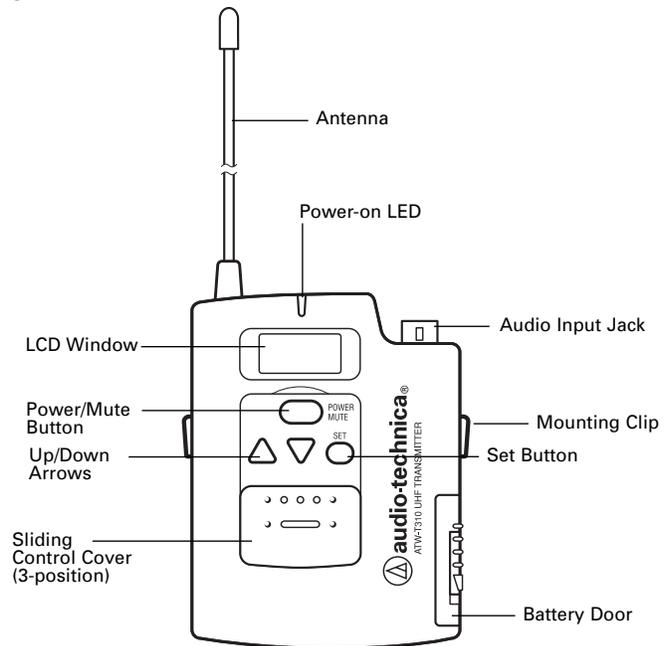
D-2. Menu Mode (Frequency)



D-3. Edit Mode (Frequency)

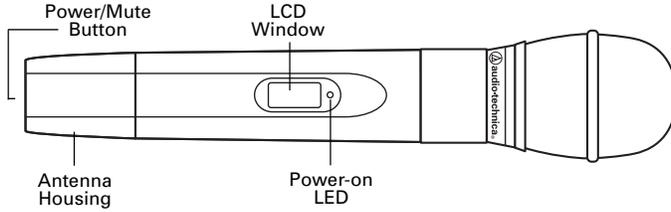
UniPak Transmitter

Figure E



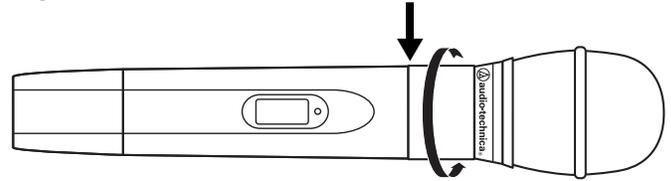
Handheld Transmitter Exterior

Figure F



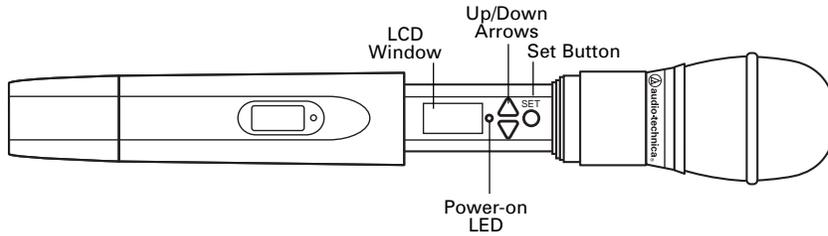
Opening Handheld Transmitter

Figure G



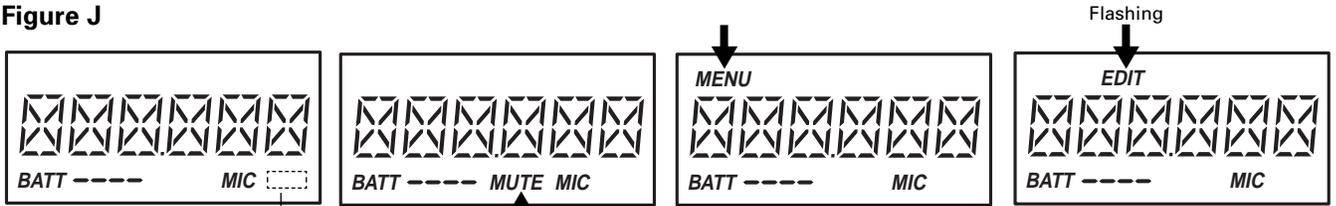
Handheld Transmitter Interior

Figure H



Transmitter LCD Window

Figure J



J-1. Normal Operation

* ATW-T310 only: "INST"

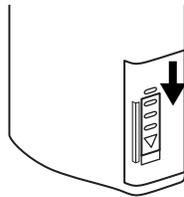
J-2. Operation with Mute On

J-3. Menu Mode (Frequency)

J-4. Edit Mode (Frequency)

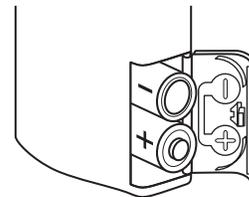
UniPak Battery Door

Figure K



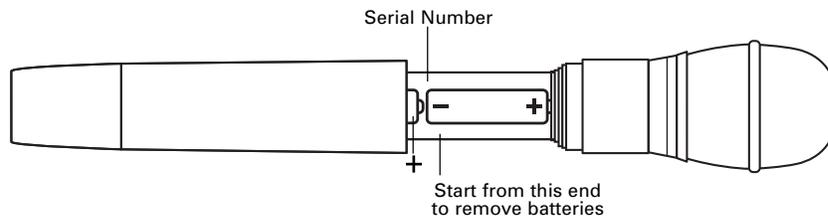
Installing UniPak Transmitter Batteries

Figure L



Installing Handheld Transmitter Batteries

Figure M



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.

Visit our Web Site!
www.audio-technica.com



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

P2323-02920 P51506 ©2002 Audio-Technica U.S., Inc. Printed in Japan