Professional UHF Wireless Systems

ATW-R92 UHF Synthesized Diversity Dual Receiver

Installation and Operation

audio-technica®

ATW-R92 UHF Synthesized Diversity Dual Receiver

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 conformit 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.

Individuals with implanted cardiac pacemakers or AICD devices: Please see notice on back cover.

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

CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN	AVIS RISQUE DE CHOC ELECTRIQUE NE PAS OUVRIR

To prevent electric shock, do not remove the cover. There are no user-serviceable parts inside. Internal adjustments are for qualified professionals only. Refer all servicing to qualified service personnel.

Pour prevenir un choc electrique, ne pas ouvrir le couvercle. Il n'y aucune pieces de rechanges a l'interieur. Tout ajustement interne doit etre fait par une personne qualifi seulement. Referez tout reparation au personnel qualifie.

Warning: This apparatus must be grounded. This product is a safety class 1 product. There must be an uninterruptible safety earth ground from the main power source to the product's AC input. Whenever it is likely that the protection has been impaired, disconnect the power cord until the ground has been restored.

Attention: Cet appareil doit etre mise a la terre. Cet appareil est de classe de surete 1. Il doit y avoir un ininterrompable de mise a la terre de securite provenant de la source principale de courant de l'appareil de l'entree du courant alternatif. Quand la protection a ete affaiblie, d brancher le fil de courant jusqu'a la mise a terre a bien ete reetablie.

Warning: To prevent fire or shock hazard, do not expose this appliance to rain or moisture.

Attention: Pour prevenir feu ou choc electrique, ne pas expose l'appareil a la pluie ou a l'humidite.

Caution/Avis: For continued protection against fire hazard, replace only with same type/rating of fuse.
Pour poursuivre la protection contre le feu, replacez la fusible de meme type/cote.

Warning/Attention: There are some sharp edges inside. To reduce the risk of injury, do not remove cover.
Bord tranchant a l'interieur. Pour reduire le risque de blessure, ne pas ouvir le couvercle.

Introduction

Audio-Technica Engineered Sound wireless systems are offered as separate receiver and transmitter units, rather than in predetermined combinations, for greatest system flexibility. Operating details for Engineered Sound transmitters are included with each transmitter.

Engineered Sound receivers feature a sophisticated Tone Lock[a] tone squelch system that opens only when an Engineered Sound transmitter is detected, reducing the possibility of interference. As a result, Engineered Sound 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.

The ATW-R92 Dual Receiver unit features two independent receivers in its housing, along with an antenna combiner/divider system. Each receiver offers 100 PLL-synthesized UHF frequencies and true diversity reception. In each receiver, two antennas feed two completely independent RF sections (Tuners) 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 ATW-R92 is housed in a full-width standard 19" (1U) rack-mountable case, with rack-mount adapters included.

The antenna combiner/divider system in the ATW-R92 provides two "A" and two "B" antenna inputs that feed each of the two diversity tuners in each receiver. As one example, the two pairs of inputs might be used when coverage of a split banquet/meeting room is difficult with a single pair of antennas, or when considerable multipath interference is present. Two "A" and two "B" antenna *output* jacks are provided to feed other wireless receivers operating in the same frequency band. With the addition of two more ATW-R92 dual receiver units, up to six receiver channels can be operated from a single pair of antennas. However, any type of receiver in the same band, or even a separate active antenna divider, may be fed by the antenna outputs. The ATW-R92 also provides +12V DC on the antenna input jacks to power in-line RF devices.

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

Receiver Installation

Location

For best operation the receiver should be at least 1 m. above the ground and at least 1 m. away from a wall or metal surface to minimize reflections. The transmitter should be at least 1 m. from the receiver, as shown in Figure A.

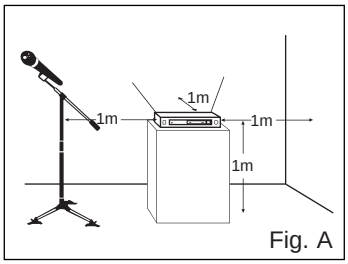


Fig. A

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

Output Connections
There are two audio output jacks on the back for each of the receivers: balanced (4 mV) and unbalanced (40 mV). Use shielded audio cable for the connection between the receiver and the mixer. If the input of the mixer is a 6.3mm jack, connect a cable from the 6.3mm 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 tape recorder and a mixer can be driven by each receiver.

Antennas
Attach a pair of UHF antennas to the antenna input jacks; connect one to the main "Antenna A In" jack and one to the main "Antenna B In" jack. See Figure B. The antennas are normally positioned in the shape of a "V" (45 degree from vertical) for best reception.

The antennas can be remotely located from the receiver. However, due to signal loss in cables at UHF frequencies, use the lowest-loss RF cable type(s) practical for any cable runs over 25 feet. RG-8 is a good choice. Use only copper-shielded cable, not CATV-type foil-shielded wire.

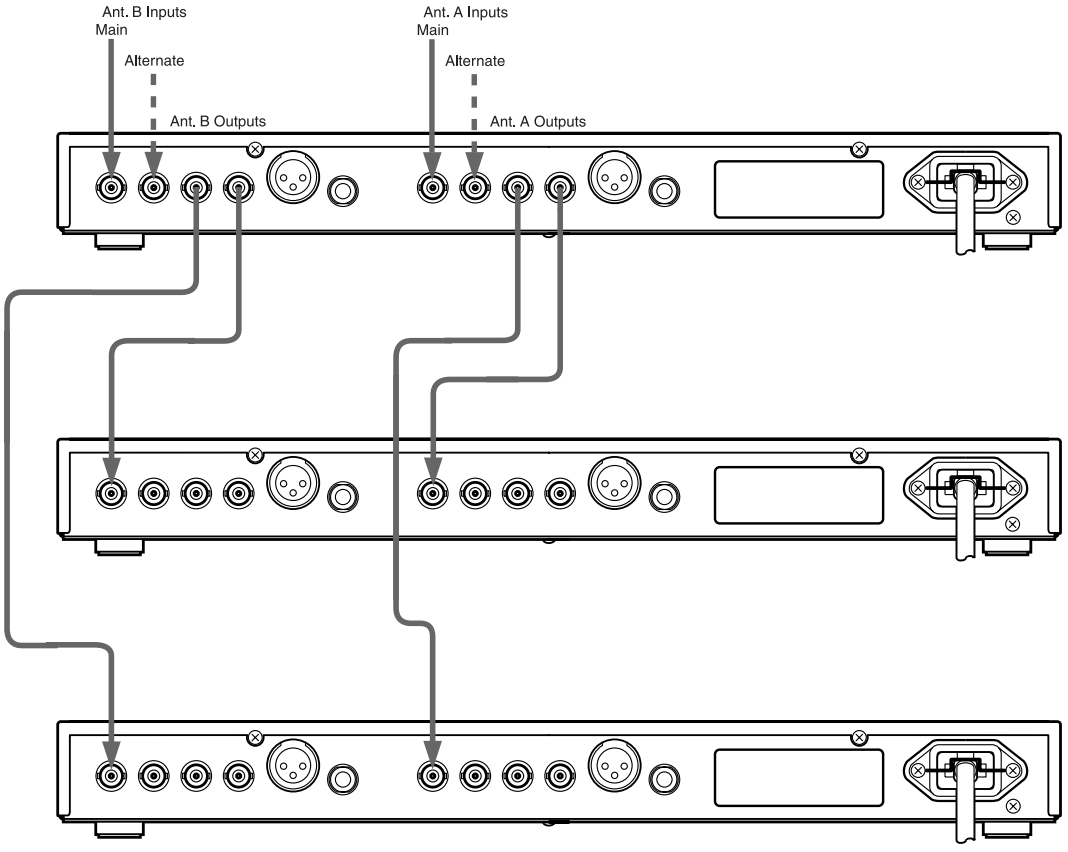
The two pairs of antenna inputs might be used when coverage of a split banquet/meeting room is difficult with a single pair of antennas, or in the case of multipath-prone areas. Simply connect another set of *remote* antennas to the alternate "A" and "B" inputs. (Main and alternate antenna inputs are identical and interchangeable.) The unique RF nature of each venue normally requires some experimentation to determine the best locations, if any , for additional antennas.

All four antenna input jacks also provide +12V DC output on their center pins to power in-line RF devices. A combined total of 20 mA can be drawn from the "A" jacks and 20 mA from the "B" jacks. While an accidental short-circuit will not harm the internal 12V supply, make certain that an antenna cable shield does not contact the center conductor .

Power Connections
The switching power supply is designed to operate properly from any AC power source 120-240V, 50/60 Hz without adjustment. Simply connect to a standard AC power outlet, using an IEC input cordset approved for the country of operation. Use the included cable clamp to secure the plug in the chassis connector. Power to the unit is controlled by the front-panel Power switch.

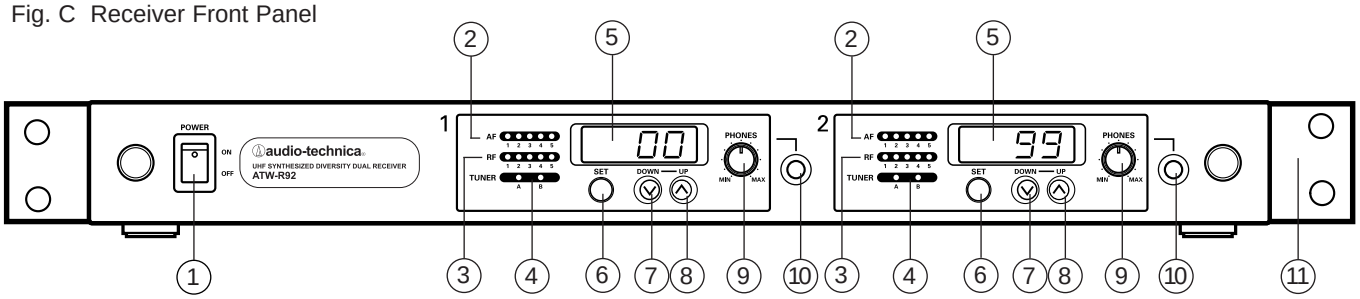
Headphone Jack
A headphone jack on the front panel provides monitoring of each receiver's output. The 6.3mm jack is intended for use with stereo headphones. The "Phones" level control affects the headphone jack only.

Fig. B Antenna Connections



Receiver Controls And Functions

Fig. C Receiver Front Panel



Front Panel Controls and Functions (Fig. C)

(1) POWER SWITCH: Press switch On and the Channel Designator Displays (5) will light.

Receiver 1 / Receiver 2
Controls and operation of the two receivers are identical.

(2) AF LEVEL INDICATOR: Indicates the audio modulation level of the received signal. The LEDs light up from left to right.

(3) RF LEVEL INDICATOR: Indicates the strength of the RF signal received from the transmitter .

(4) TUNER OPERATION INDICATOR: Indicates which Tuner (A or B) has the better reception and is in operation. Lights only when receiving an ES transmitter's signal.

(5) CHANNEL DESIGNATOR DISPLAY: Indicates the current channel setting.

(6) CHANNEL SET BUTTON: Hold this button in and press "Up" or "Down" to change the channel shown in the Channel Designator Display.

(7) CHANNEL SELECTOR "DOWN" SWITCH: Changes the channel designator, decreasing from 99 to 00. "Rolls over" from 00 to 99.

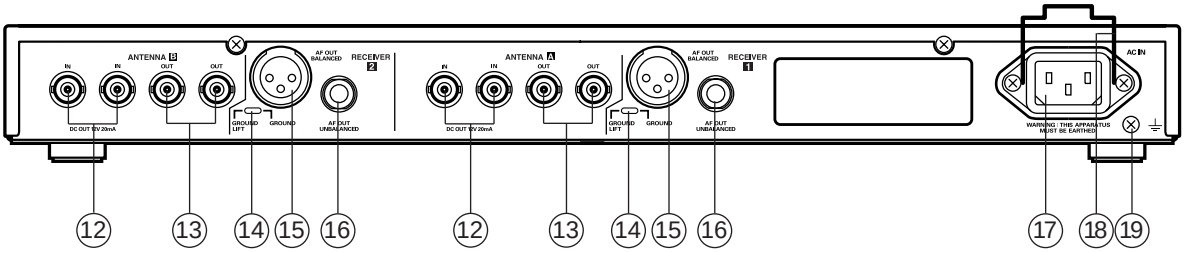
(8) CHANNEL SELECTOR "UP" SWITCH: Changes the channel designator, increasing from 00 to 99. "Rolls over" from 99 to 00.

(9) "PHONES" LEVEL CONTROL: Adjusts the level of the headphone jack only; it does not affect receiver audio output.

(10) HEADPHONE OUTPUT 6.3mm phone jack. Plug in a "stereo" headphone to monitor receiver signal.

(11) MOUNTING ADAPTERS: For mounting the receiver in any standard 19" rack. Attach to receiver with screws supplied.

Fig. D Receiver Rear Panel



Rear Panel Controls and Functions (Fig. D)

Antenna "A" / Antenna "B"

(12) INPUT JACKS: BNC-type antenna connectors for "A" and "B" T uners in both receivers. Attach antennas directly, or extend them with low-loss antenna cable. See the "Antennas" section on page 3 for more details.

(13) OUTPUT JACKS: Provide RF distribution to other receivers operating in the same frequency band. Each output should be connected to only one other antenna input, without "daisy-chaining." (Using two additional ATW-R92 dual receiver units provides a total of six channels in three rack spaces with a single pair of antennas.)

Receiver 1 / Receiver 2

(14) GROUND LIFT SWITCH: Disconnects the ground pin of the balanced output (15) from ground. Normally, the switch should be to the right (ground connected). If hum caused by a ground loop occurs, slide switch to the left.

(15) 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.

(16) UNBALANCED AUDIO OUTPUT JACK: 6.3mm phone jack. Can be connected to an unbalanced aux-level input of a mixer, guitar amp or tape recorder.

(17) AC POWER: IEC-type connector for 120-240V AC 50/60 Hz power input. No adjustment for mains voltage/frequency is necessary.

(18) POWER CABLE CLAMP: Use provided cable clamp to secure the plug in the chassis connector.

(19) GROUND TERMINAL: Case grounding screw, if needed.

System Operation

Turn down the mixer /amplifier level before starting up the wireless system.

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

Receiver On...

The Channel Designator Displays will light. If any of the RF LEDs light up at this point, there may be RF interference in the area. If this occurs, select another frequency using the front-panel channel selectors. While holding in the "Set" button, press the "Up" or "Down" button to access the desired frequency; then release the Set button to select the channel.

Transmitter On...

Refer to the manual included with each Engineered Sound transmitter for details of setup and operation.

Before turning on the transmitter , *make certain it is set to the same operating channel as the receiver* . When the transmitter is switched on and in normal operation, the receiver's RF signal level indicators will light up from left to right. For optimum performance at least four , and preferably five, of the signal strength indicators should light up when the transmitter is switched on. One of the T uner LEDs (A or B) also will light up when the transmitter is on, indicating that its signal has been received and the receiver's Tone Lock squelch circuit has opened.

Setting Levels

Although Engineered Sound receivers require no level adjustment, correct adjustment of transmitter audio input and mixer/amplifier input and output levels is important for optimum system performance.

Engineered Sound transmitters include adjustments for optimum audio modulation levels. Refer to the transmitter' s manual for full details. Maximum audio input to the mic or guitar should light about three or four green LEDs on the receiver's AF Level indicator. Audio modulation from the transmitter level should not be allowed to light the red LED - doing so will cause the system to overload and distort.

The audio output level of the ATW-R92 has been optimized for best performance and no adjustment is necessary. The level control on the front panel controls the headphone jack only.

Receiver Squelch

The sophisticated Tone Lock® system in AT wireless units eliminates the need for any user-adjustable squelch control on the receiver. Do not attempt to open the receiver housing or adjust any internal alignment controls.

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.

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 together than three feet.
4. The receiver antennas should be in the open and away from any metal. If mounted in a rack, have the unit on top, or use external/remote antennas.
5. Each transmitter/receiver pair must be set to the same channel number.
6. A single receiver cannot receive signals from two transmitters at the same time.
7. For best operation, all the RF Level LEDs should be lit (maximize RF input); but only the first two or three AF Level LEDs should be lit (don't overmodulate).
8. You need to change channels 1) when a strong interference signal is received, 2) when the channel breaks down, or 3) during multiple-system operation in order to select an interference-free channel.
9. In the UniPak transmitter, the "MT" or "GT" input control not in use should be set to minimum.
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.

Specifications

OVERALL SYSTEM

Operating Frequency	UHF band, 800.550 to 819.700 MHz
Number of Channels	100 total
Frequency Stability	±0.005%, Phase Lock Loop frequency control
Modulation Mode	FM
Normal Deviation	±5 kHz
Tone Squelch Frequency	32.768 kHz
Operating Range	90m typical
Operating Temperature Range	5C degree to 45C degree
Frequency Response	100 Hz to 15 kHz

ATW-R92 RECEIVER

Receiving System	Dual independent tuners, automatic switching diversity
Image Rejection	>100 dB
Signal-to-noise Ratio	>107 dB (IEC-weighted at ±40 kHz deviation)
Total Harmonic Distortion	<1% (±5 kHz deviation at 1 kHz)
Sensitivity	18 dBµV (S/N 60 dB at ±5 kHz deviation, IEC-weighted)
Intermediate Frequencies	54.25 MHz, 10.7 MHz
Audio Output	
Unbalanced:	40 mV (at 1 kHz, ±5 kHz deviation, 1M ohm load)
Balanced:	4 mV (at 1 kHz, ±5 kHz deviation, 600 ohm load)
Output Connectors	
Unbalanced:	6.3mm phone jack
Balanced:	XLRM-type
Headphone Output	20 mW max. into 16 ohms (at 1 kHz, ±5 kHz deviation)
Antenna Inputs	BNC-type, 50 ohms, two "A" and two "B"
Antenna Outputs	BNC-type, 50 ohms, two "A" and two "B"
Antenna Power	+12V DC on input jacks, 20 mA max. from "A" jacks, 20 mA max. from "B" jacks
Power Supply	120-240V AC, 50/60 Hz, autoadjusting
Dimensions	430.0 mm W x 44.0 mm H x 175.0 mm D without antennas, rack-mount adapters
Weight	2.9 kg
Accessories Included	Two flexible UHF antennas, rack-mount adapters, power cable and power cable clamp

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

Receiver Accessories

ATW-A20	Pair of UHF ground-plane antennas with 5/8"-27 thread for mounting to microphone stands, etc. Takes RF cables with BNC connectors, not included.
ATW-D80	UHF (800 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. 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 future reference, please record your system information here (the serial number appears on the bottom of the receiver):

Receiver ATW-R92 Serial Number _____ _____ _____ _____ _____ _____ _____

Audio-Technica UHF Wireless Operating Frequencies

Frequency and Channel Designator List

Designator	Frequency (MHz)	Designator	Frequency (MHz)
00	800.550	50	810.075
01	800.575	51	810.200
02	800.600	52	810.325
03	801.100	53	810.550
04	801.125	54	810.575
05	801.150	55	811.075
06	801.200	56	811.100
07	801.450	57	811.550
08	801.925	58	811.575
09	801.950	59	811.600
10	801.975	60	811.700
11	802.075	61	812.775
12	802.200	62	812.800
13	802.225	63	812.825
14	802.250	64	812.850
15	802.325	65	813.075
16	802.575	66	813.100
17	803.025	67	813.125
18	803.050	68	813.200
19	803.075	69	813.300
20	803.550	70	813.750
21	803.575	71	813.775
22	803.600	72	814.850
23	803.625	73	814.875
24	803.700	74	814.950
25	804.825	75	815.425
26	805.075	76	815.450
27	805.150	77	816.525
28	805.200	78	816.550
29	805.300	79	816.575
30	805.775	80	816.650
31	806.900	81	817.100
32	806.925	82	817.125
33	806.950	83	817.200
34	807.400	84	817.450
35	807.425	85	817.925
36	807.450	86	817.950
37	808.525	87	818.075
38	808.550	88	818.200
39	808.575	89	818.225
40	808.600	90	818.325
41	808.625	91	818.550
42	809.100	92	818.575
43	809.175	93	819.025
44	809.200	94	819.050
45	809.225	95	819.075
46	809.450	96	819.550
47	809.475	97	819.575
48	809.925	98	819.600
49	809.950	99	819.700

Multi-channel Systems

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

Group A: Channels 01 (or 04), 09, 13, 18, 22, 32, 34, 40, 44, 47 *-or-*
Group B: Channels 56, 58, 63, 66, 78, 81, 85, 88, 93, 97

Notice to individuals *with implanted car diac 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.

audio-technica®

Audio-Technica US., Inc., 1221 Commerce Drive, Stow, Ohio 44224 330/686-2600

Audio-Technica Corporation, 2206 Naruse,Machida, Tokyo 194-8666, Japan Form No. ATGC-0023-04-WM