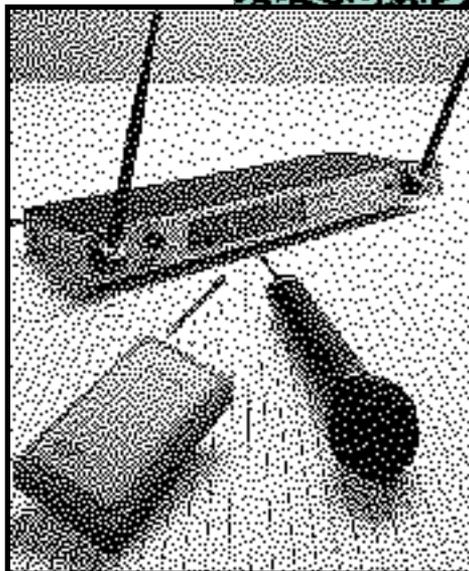


**UHF
SERIES**

**TRUE
DIVERSITY
WIRELESS
SYSTEM**



UR-4 RECEIVER

UT-4 BELT PACK TRANSMITTER

UH-4 HAND-HELD MICROPHONE TRANSMITTER

DA-5H UHF ANTENNA DISTRIBUTION AMPLIFIER

•dbx® Noise Reduction

SAMSON®

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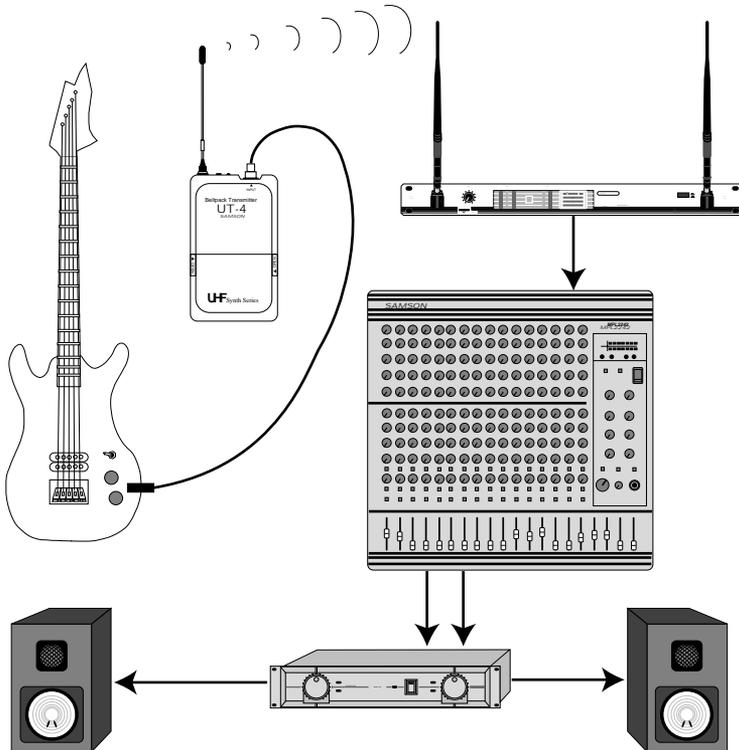
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Introduction

Congratulations on purchasing the Samson UHF Series True Diversity System! Although this product is designed for easy operation, we suggest you take some time out first to go through these pages so you can fully understand how we've implemented a number of unique features.

Every wireless system consists of at least two components—a receiver and a transmitter, both of which must be tuned to the same channel (that is, the same radio frequency) in order to operate correctly.* The UHF Series System you have purchased contains a UR-4 receiver and either our UT-4 belt-pack transmitter (for lavalier microphone, headset microphone, and guitar applications) or our UH-4 hand-held microphone transmitter. The illustration below shows an overview of our system design:



* Your receiver and transmitter have been factory preset to utilize the same channel. A listing of the six available channels and their corresponding UHF frequencies can be found on page 34 of this manual.

Introduction

The concept behind a “true diversity” wireless system is that a single chassis houses two discrete receivers (called “channel A” and “channel B”) instead of one, with both tuned to the same frequency but with each using an independent antenna. A built-in computer chip then continuously scans the two receivers and determines which one has the clearest and strongest reception, automatically (and silently) switching to that channel. This allows you to maintain the wireless communication link over a much broader area range than would be allowed by a single receiver and also virtually eliminates interference and phase cancellation problems. In addition, our special circuitry, which utilizes the UHF (Ultra High Frequency) band, delivers the highest-quality sound available in any wireless system. Finally, the provision of dbx® noise reduction* produces crystal-clear sound with minimized background noise and hiss. Your UHF Series True Diversity System may also optionally include a DA-5H UHF Antenna Distribution Amplifier. For more information on this device, see pages 26 - 31.

In this manual, you’ll find a more detailed description of the features of this system, as well as a guided tour through all components, step-by-step instructions for setting up your system, trouble-shooting tips, wiring diagrams and tables, a glossary of terms, and full specifications. You’ll also find a warranty card enclosed—don’t forget to fill it out and mail it! This will enable you to receive online technical support and will allow us to send you updated information about these and other Samson products in the future.

SPECIAL NOTE: Should any component of your UHF Series True Diversity Wireless System ever require servicing, a *Return Authorization* number (RA) is necessary. Without this number, the unit will not be accepted. Please call Samson at 1-800-372-6766 for a Return Authorization number prior to shipping your unit. Please retain the original packing material and, if possible, return the unit in its original carton and packing materials.

* *dbx* is a registered trademark of Carillon Industries.

System Features

The Samson UHF Series True Diversity System utilizes state-of-the-art technology in wireless communications. Here are some of its main features:

- The use of the UHF (Ultra High Frequency) band as opposed to VHF (Very High Frequency). This yields better signal-to-noise ratio and improved frequency response—in plain English, superior sound quality. The UHF band is also considerably less crowded than VHF, thus minimizing potential interference problems. In addition, our special *dielectric filtering* circuitry (which, incidentally, is based upon cellular phone technology) provides extra narrow bandwidths, thus further reducing interference.
- Six available channels that can be used in the same location simultaneously. This maximizes the system's effectiveness in UHF multi-system venues and ensures noise-free performance when used side by side with VHF systems in crowded RF environments.
- True Diversity technology, which greatly extends the effective range of the system and also virtually eliminates interference and phase cancellation problems.
- Built-in dbx® noise reduction circuitry in both the transmitter and receiver. This ensures clear, transparent sound with an absolute minimum of background noise and hiss.
- The UR-4 receiver provides a clear, easy-to-read visual display that shows continuous RF (Radio Frequency) level (indicating the strength of the received signal) as well as AF (Audio Frequency) level.
- The UR-4 receiver offers both balanced and unbalanced audio outputs, making it compatible with all types of external audio mixers and amplifiers.
- Tuned coaxial receiver antennas are included, with options for rear-mounting or remoting if extended range is required.
- The UT-4 and UH-4 transmitters both accept standard 9-volt alkaline batteries.

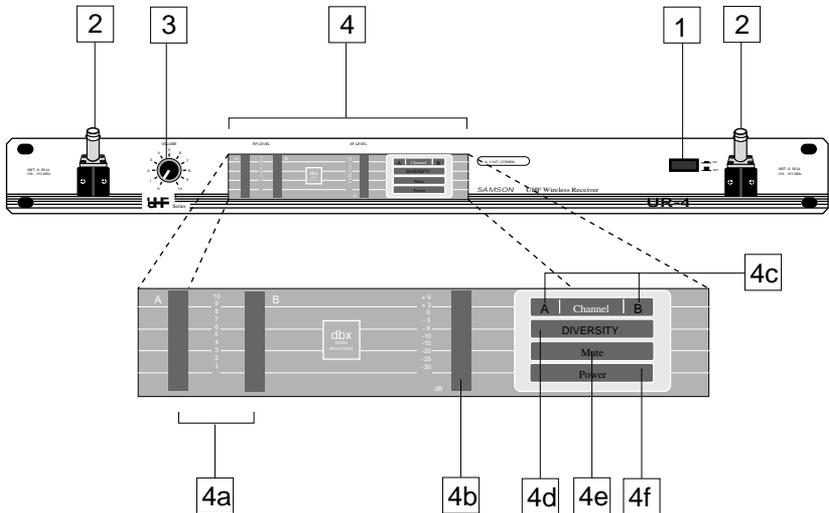
System Features

- The UT-4 belt-pack transmitter is extremely light-weight (less than 4 ounces with a 9-volt battery installed) and is suited for a wide range of lavalier microphones, headset microphones and instruments such as electric guitar and bass. It also provides phantom powering, making it compatible with professional condenser lavalier and headset microphones.
- The UH-4 hand-held microphone transmitter features an all-brass housing painted with a durable epoxy base. The unit is finished in a smooth, non-glare black neoprene covering to ensure a firm, comfortable grip. A selection of mic capsules are available, including:

Electro Voice **757** N/DYM Dynamic
Electro Voice **857** N/DYM Dynamic
Sennheiser **MKE-4032** Condenser
Shure **SM58** Dynamic
Shure **SM85** Condenser
Shure **SM87** Condenser

- Both the UT-4 and UH-4 transmitters provide “popless” muting, which turns off the audio signal while leaving the carrier signal on.
- Both the UT-4 and UH-4 transmitters offer Sensitivity controls that adjust the transmitter input level for different user sound pressure levels and different mic capsules or lavalier/headset microphones.
- All components have rugged construction that ensures reliable operation in even the most demanding performance environments.

Guided Tour - UR-4 Front Panel



1: Power switch - Use this to turn the main power on and off. When the receiver is on, both the “Power” and “Diversity” LEDs in the display section (see #4d and #4f on the following page) will be lit.

2: Antenna A and B mountings - Connect the supplied antennas to these mountings. Third-party receiver antennas should *not* be substituted—use only the antennas provided with your receiver.

3: Volume control - This knob determines the level of the audio signal being output through both the balanced and unbalanced output jacks on the rear panel.

4: Display section - Shows information about the current status of the receiver.

4a: RF (Radio Frequency) Level “A”/“B” display - This “ladder” display (similar to the VU bar meter used on audio devices) continuously indicates the strength of the UHF signal being received by antennas A and B. When all ten segments are lit, the incoming signal is at maximum strength; when only the lowest segment is lit, the incoming signal is at minimum strength. If no segments are lit, no signal is being received; check to ensure that the transmitter is on and that the transmitter and receiver are set to the same channel (see the “Trouble-shooting” section on page 20 for more details).

Guided Tour - UR-4 Front Panel

4b: AF (Audio Frequency) Level display - This “ladder” display (similar to the VU bar meter used on audio devices) indicates the strength of audio output signal. For optimum signal-to-noise ratio, adjust the Volume knob (see #3 on the previous page) so that the “0” segment (third from the top) lights frequently, with only occasional excursions into the “+3” and “+6” segments. If none of these segments are lit, little or no signal is being output; see the “Trouble-shooting” section on page 20 for more details.

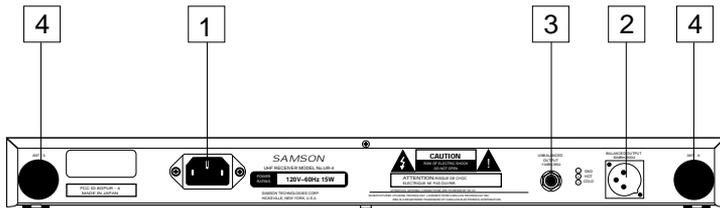
4c: “A”/“B” LEDs - These LEDs show you whether signal from the “A” or “B” receiver is currently being used; when signal is being received, one of them will be lit. A computer chip inside the UR-4 constantly scans the two and automatically selects whichever is receiving the strongest, clearest signal. This “true diversity” switching is completely inaudible, but it effectively increases overall range while reducing potential interference and phase cancellation problems.

4d: “Diversity” LED - Lights whenever the UR-4 is powered on.

4e: “Mute” LED - Lights to indicate the absence of carrier signal. When “MUTE” is lit, either the transmitter Mute switch is in the “on” position or the transmitter’s channel does not match that of the receiver.

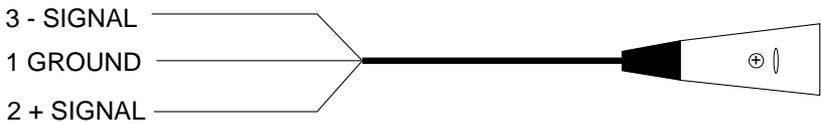
4f: “Power” LED - Lights whenever the UR-4 is powered on.

Guided Tour - UR-4 Rear Panel



1: AC input - Connect the supplied standard 3-pin “EEC” plug here.

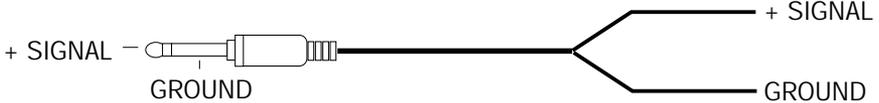
2: Balanced output* - Use this electronically balanced low impedance (600 Ohm) XLR jack when connecting the UR-4 to professional (+4) audio equipment. Pin wiring is as follows:



** If required, both the balanced and unbalanced outputs can be used simultaneously.*

Guided Tour - UR-4 Rear Panel

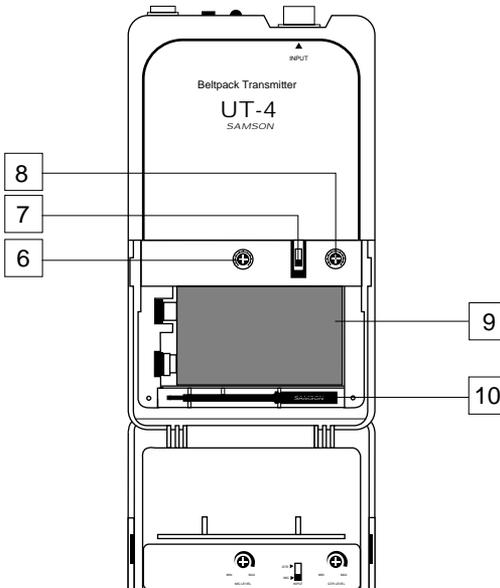
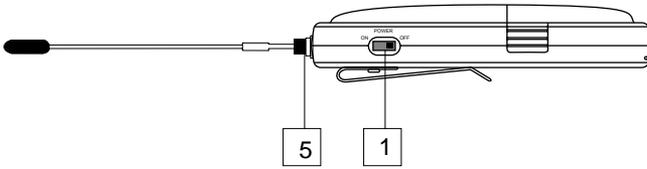
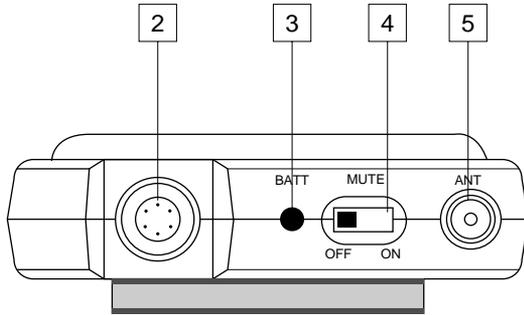
3: Unbalanced output* - Use this unbalanced high impedance (5K Ohm) 1/4" jack when connecting the UR-4 to consumer (-10) audio equipment. Wiring is as follows:



4: Rear-mount antenna knockouts - The receiver antennas can optionally be mounted at these areas of the rear panel. Contact Samson Technologies for information about our rear-panel antenna mounting kit.

** If required, both the balanced and unbalanced outputs can be used simultaneously.*

Guided Tour - UT-4



Guided Tour - UT-4

1: Power On-Off switch* - Use this to turn the UT-4 on or off (to conserve battery power, be sure to leave it off when not in use).

2: Six-pin input connector - Connect your input device (lavalier microphone, headset microphone or instrument cable) here, using the supplied six-pin connector. A wiring diagram and chart (showing connections for many popular lavalier and headset mics) is presented on pages 23 - 25.

3: Battery LED - This LED is an indicator of battery strength. If the battery is sufficiently strong, when the UT-4 is first powered on, this LED will light for about two-tenths of a second and then go off. When battery voltage is low, this LED lights steadily, indicating that the battery needs to be replaced.

4: Mute Off-On switch - When set to the “Off” position, audio signal is transmitted. When set to the “On” position, the audio signal is muted. Because the carrier signal remains during muting, no “pop” or “thud” will be heard. Note that turning this off does *not* turn off the transmitter power—it is simply a way to temporarily mute the transmission of audio signal. If you don’t plan on using the transmitter for extended periods, turn off the transmitter power by using the power on-off switch (see #1 above).

5: Antenna - Connect the supplied transmitter antenna to this mounting. Replacement antennas are available from Samson Technologies if required.

** Be sure to mute the audio signal at your external mixer or amplifier before turning transmitter power on or off, or an audible pop may result.*

Guided Tour - UT-4

6: MIC Level control (trimpot) - If you are using the UT-4 with a lavalier microphone, use the supplied plastic screwdriver to set this input sensitivity control to the optimum level. See the "Setting Up and Using the UHF Series System" section on page 15 for more information.

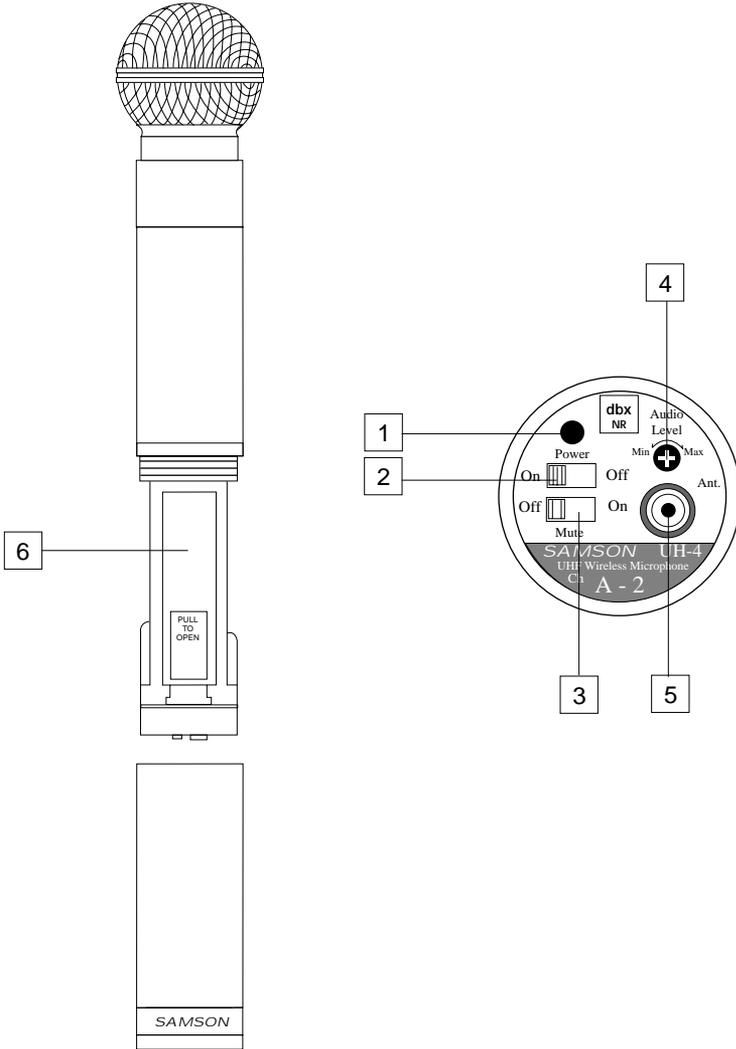
7: Input switch - Set this to either the "GTR" position (if you are using the UT-4 with an instrument such as an electric guitar or bass) or to the "MIC" position (if you are using it with a lavalier or headset microphone).

8: GTR Level control (trimpot) - If you are using the UT-4 with an instrument such as an electric guitar or bass, use the supplied plastic screwdriver to set this input sensitivity control to the optimum level. See the "Setting Up and Using the UHF Series System" section on page 15 for more information.

9: Battery holder - Insert a standard 9-volt alkaline battery here, being sure to observe the plus and minus polarity markings shown.

10: Plastic screwdriver - Specially designed for use in adjusting the UT-4 MIC or GTR Level controls (see #6 and #8 above). See the "Setting Up and Using the UHF Series System" section on page 15 for more information.

Guided Tour - UH-4



Guided Tour - UH-4

1: Power LED - This LED is an indicator of battery strength. If the battery is sufficiently strong, when the UH-4 is first powered on, this LED will light for about two-tenths of a second and then go off.* When battery voltage is low, this LED lights steadily, indicating that the battery needs to be replaced.

2: Power On-Off switch* - Use this to turn the UH-4 on or off (to conserve battery power, be sure to leave it off when not in use).

3: Mute Off-On switch - When set to the “Off” position, audio signal is transmitted. When set to the “On” position, the audio signal is muted. Because the carrier signal remains during muting, no “pop” or “thud” will be heard. Note that turning this off does *not* turn off the transmitter power—it is simply a way to temporarily mute the transmission of audio signal. If you don’t plan on using the transmitter for extended periods, turn off the transmitter power by using the power on-off switch (see #2 above).

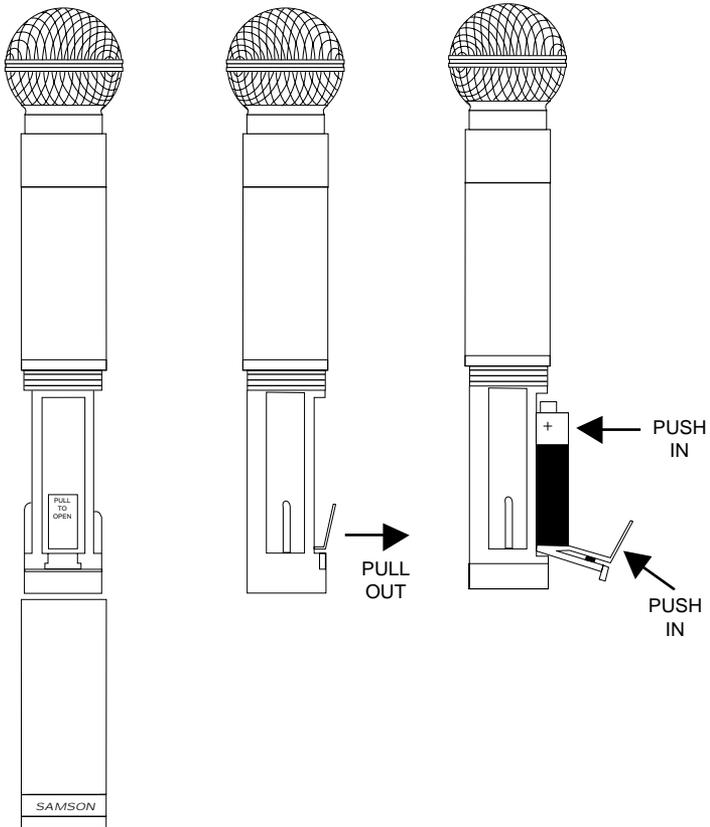
4: Audio Level control (trimpot) - Use the supplied plastic screwdriver to set this to the optimum microphone output level. See the “Setting Up and Using the UHF Series System” section on page 15 for more information.

5: Antenna - Connect the supplied transmitter antenna to this mounting. Replacement antennas are available from Samson Technologies if required.

** Be sure to mute the audio signal at your external mixer or amplifier before turning transmitter power on or off, or an audible pop may result.*

Guided Tour - UH-4

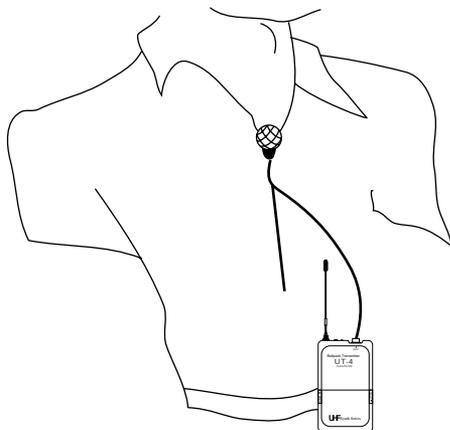
6: Battery holder - Insert a standard 9-volt alkaline battery here. As shown in the illustration below, installation is accomplished as follows: unscrew the bottom section of the UH-4 (turn counterclockwise), then pull out the nylon sled (marked "Pull To Open"). Next, place the battery in the UH4, with the battery terminals facing the top of the mic capsule, and, finally, push the sled back in. The purpose of the sled is to ensure a tight fit; if you encounter resistance, you have installed the battery backwards—remove it, reverse the position of the terminals, and reinstall.



Setting Up and Using the UHF Series System

The general procedure for setting up and using your UHF Series System is basically the same regardless of whether you are using a UT-4 or UH-4 transmitter:

1. Remove all packing materials (save them in case of need for future service) and mount the supplied “A” and “B” antennas to your receiver by inserting the BNC connector and twisting clockwise until snug.
2. Connect the transmitter antenna by inserting the wire and turning it clockwise until snug.
3. If you are using the UT-4 beltpack transmitter, make the physical connection between its 6-pin plug and the lavalier microphone, headset microphone or instrument you are using (**be sure to correctly set the “MIC/GTR” switch**). Because the 6-pin plug is “keyed,” you’ll need to rotate it a certain way to get it to “mate” with the connector mounted on the UT-4; then push straight down until you hear a click. To remove the 6-pin connector, lift up the outer sleeve and pull straight out (do not use force!). We recommend that you never pull on the wire, only the plug itself (with the outer sleeve lifted). If you are using a lavalier microphone, correct placement is critical to sound quality. We recommend that you place it as shown in the illustration below—as close to your mouth as possible but off to one side (to minimize nasality) and



Setting Up and Using the UHF Series System

unobstructed by clothing. Bear in mind also that *omni-directional* microphones (mics which pick up signal from all directions) are more prone to feedback problems than *unidirectional* (*cardioid* or *supercardioid*) ones; in general, you can avoid feedback by taking care not to use any microphone directly in front of a PA speaker (if this is unavoidable, you can try using an equalizer to attenuate those high frequencies which are causing the feedback “squealing”).

4. Place a fresh 9-volt alkaline battery (not supplied) into your UT-4 or UH-4 transmitter, taking care to observe the polarity markings (if you are using a UH-4, follow the battery installation instructions given on page 14). We recommend the Duracell MN 1604 type or equivalent. We do not recommend the use of rechargeable Ni-Cad batteries because they do not supply adequate current for any significant time period. For the moment, leave the transmitter turned off.

5. With the power to your amplifier and/or mixer off, make the physical cable connections between the output of your UR-4 receiver (using either the balanced or unbalanced jacks)* and the input of your amplifier or mixer. If you are using professional (+4) equipment, the balanced jack is preferable since it will deliver an electromagnetically cleaner signal. When using a mixer that provides low impedance mic inputs, always connect the UR-4 output to those mic inputs as opposed to line-level (high impedance) inputs. Also, do not connect the output of the UR-4 directly to the line-level input of signal processors; to apply effects to the UR-4 output signal, connect signal processors to mixer insert points.

6. Connect the supplied 3-pin “EEC” plug into the UR-4 rear panel AC connector and plug the other end into any grounded AC socket.

7. Turn the Volume knob on the UR-4 receiver completely counter-clockwise (to the “0” position) and depress the power switch to turn the unit on. The “Power” LED in the display section will light up.

** If required, both the balanced and unbalanced outputs can be used simultaneously.*

Setting Up and Using the UHF Series System

8. Next, it's time to turn on your transmitter and set the audio levels. If you are using the UH-4 transmitter or the UT-4 transmitter with a connected lavalier or headset microphone, speak or sing into the mic at a normal performance level while slowly raising the Volume knob on the receiver. Observe the receiver's AF Level display as you do so; one or more segments should light up. If you are using the UT-4 transmitter with a connected instrument, play the instrument at normal performance level while slowly raising the Volume knob on the receiver; again, one or more segments in the AF Level display should light up. For optimum signal-to-noise ratio, adjust the Volume knob so that the "0" segment (third from the top) lights frequently, with the "+3" and "+6" segments lighting only occasionally. Note that unity gain is achieved with a Volume knob setting of approximately 8.

9. Temporarily mute the audio signal by placing the UH-4 or UT-4 Mute switch to the "On" position. Then turn on your connected amplifier and/or mixer but keep its volume all the way down. Next, unmute the audio signal (by placing the UH-4 or UT-4 Mute switch to the "Off" position) and speak into the microphone (or play the instrument) at a normal performance level. Slowly raise the volume of your amplifier and/or mixer until the desired level is reached. If you hear distortion at the desired volume level, first make sure that the gain structure of your audio system is correctly set (consult the owners manual of your mixer and/or amplifier for details). If it is and distortion is still present, do the following:

- If you are using a UT-4 beltpack transmitter, use the supplied plastic screwdriver to turn its MIC Level or GTR Level control (trimpot) slowly counterclockwise until the distortion disappears.
- If you are using a UH-4 handheld transmitter, use the supplied plastic screwdriver to turn its Audio Level control (trimpot) slowly counterclockwise until the distortion disappears.

Conversely, if you hear a weak, noisy signal at the desired volume level, again make sure that the gain structure of your audio system is correctly set (consult the owners manual of your mixer and/or amplifier for details). If it is and the signal coming from the UR-4 is still weak and/or noisy, do the following:

Setting Up and Using the UHF Series System

- If you are using a UT-4 beltpack transmitter, use the supplied plastic screwdriver to slowly turn its MIC Level or GTR Level control (trimpot) clockwise until the signal reaches optimum level without distortion.
- If you are using a UH-4 handheld transmitter, use the supplied plastic screwdriver to slowly turn its Audio Level control (trimpot) clockwise until the signal reaches optimum level without distortion.

10. When first setting up the UHF Series System in a new environment, it's always a good idea to do a walkaround in order to make sure that RF coverage is provided for your entire performance area. Accordingly, with the transmitter on and unmuted (Mute switch "Off"), walk through the entire area that will need to be covered while speaking, singing, or playing your instrument. As you do so, note that one or more segments in the UR-4 RF Level display light up; the more segments light, the stronger the signal. Also, note that the "A" and "B" LEDs on the UR-4 receiver occasionally switch on or off, always showing you which antenna is receiving the stronger signal. The basic rule of thumb for wireless audio systems is to always try to minimize the distance between transmitter and receiver as much as possible and also to try to maintain "line of sight" between the two (that is, the person using the transmitter should be able to see the receiver antennas). In fixed installations such as A/V or corporate conference rooms or for extended range applications (where the transmitter and receiver are more than 150 feet apart), it may be desirable to remote the UR-4 antennas so that the strongest possible signal is received from the planned transmission points. This can be accomplished by using standard BNC connections and 50 ohm coaxial cabling that is suitable for up to 1 gigaHertz bandwidth usage. For more information, see the "Trouble-shooting" section on page 20.

If you have followed all the steps above and are still experiencing difficulties, call Samson Technical Support (1-800-372-6766) between 9 AM and 5 PM EST.

About dbx® Noise Reduction

About dbx® Noise Reduction:

All the components in the Samson UHF Series System utilize dbx® noise reduction so as to ensure the highest fidelity sound with an absolute minimum of background noise and hiss. dbx® is a *companding* system; that is, the signal being transmitted has its dynamic range *compressed* and its high frequencies boosted (this process is known as *pre-emphasis encoding*), and the signal being received has its dynamic range *expanded* and high frequencies attenuated in an exactly opposite way (this process is known as *de-emphasis decoding*). The pre-emphasis encoding process is automatically carried out by the UT-4 and UH-4 transmitters and the de-emphasis decoding process is automatically carried out by the UR-4 receiver. For this reason, you must use these matched components in order for the noise reduction to work as intended.

Note also that the headroom available from using the dbx noise reduction system typically exceeds the peak limit of the UR-4 AF Level meter by approximately 20 dB. Therefore, you should experiment (by listening or other method) in order to find the proper signal level. In many cases, the meter will be well beyond its peaked or pinned reading without incurring any distortion of signal.

Trouble-shooting

Problem: No sound

Solution: When working correctly, both the RF Level and AF Level meter displays in the UR-4 receiver should be lit when signal is present. If they aren't, follow these step-by-step troubleshooting suggestions to identify the problem. If the answer to any of these questions is "no," you've probably located the difficulty. If both the RF Level and AF Level displays *are* lit, you can skip ahead to questions 8, 9 and 10.

1. Are your transmitter and receiver both powered on? When first powered on, the "Battery" LED in the UT-4 and UH-4 will light for two-tenths of a second and then go off, and one or more segments of the UR-4 RF Level display will be continuously lit, indicating carrier transmission.
2. Is the battery in your transmitter fresh? (If not, the "Battery" LED will be lit bright red).
3. If you're using the UT-4 belt-pack transmitter, is the "GTR/MIC" input switch set correctly? If so, is the physical lavalier, headset or instrument cable connection correctly wired and secure? If you're using the UT-4 for electric guitar or bass, check to see that the instrument's settings are correct (i.e. master volume up, etc.).
4. Is the "MUTE" LED on the receiver off and is the "Mute" switch on the transmitter set to "Off"?
5. If you are using the UH-4 or the UT-4 with a lavalier or headset microphone, is the UH-4 Audio or UT-4 MIC Level control (trimpot) on the transmitter set to a value greater than 0? If you are using the UT-4 with an instrument, is the GTR Level control (trimpot) on the transmitter set to a value greater than 0?
6. Is the Volume knob on the receiver set to a value greater than 0?
7. Are your transmitter and receiver both operating on the same channel number? (If not, contact Samson.)
8. Is the cable connection between the UR-4 output and your mixer/amplifier input secure?

Trouble-shooting

9. Is your mixer/amplifier system powered on and is its level control or fader up and unmuted?
10. If you're using a mixer, are all channels out of solo mode?

If the answer to all these questions is “yes” and you still hear no sound, call Samson Technical Support at 1-800-372-6766. Bear in mind also that both the receiver and transmitter in the UHF Series System contain delicate components called *crystals*. As their name implies, these are subject to damage when the unit is subjected to extreme stress (such as being dropped from a significant height), so treat your receiver and transmitter with the kind of TLC you normally reserve for loved ones!

Problem: Distorted sound (Cross-modulation interference)

Solution: This will occur if two or more UHF Series (or other wireless) systems are being used at the same location and are set to the same channel. If multiple wireless systems are used at the same location, each system must be on a *different* channel.

Also, if the UR-4 receiver is mounted in a rack near equipment such as computers, hard drives, or electronic keyboards or tone generators, intermodulation noise can occur. Try moving the receiver 5 or 6 feet away from such equipment—if the noise disappears, you've located (and solved) the problem.

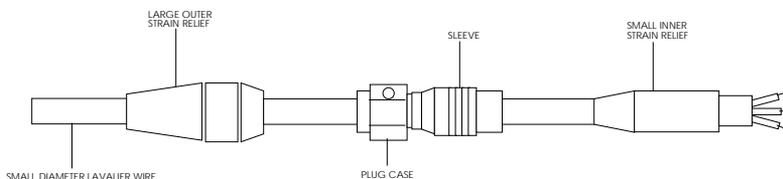
Trouble-shooting

Problem: Sound fades as performer moves around (sound dropout)

Solution: Try relocating the transmitter and/or receiver. In general, it's best to minimize the distance between the two and also to try to keep a clear "line of sight," so that the person wearing or using the transmitter can always see the receiver. If necessary, try relocating the receiver antennas to either the rear panel (contact Samson Technologies for details about our rear panel mounting kit) or remote them some distance from the receiver, using 50 ohm coaxial cable suitable for up to 1 gigaHertz bandwidth (the lower the capacitance of the cable, the further you can remote the antennas).

UT-4 Multi-pin Lavalier Wiring Guide

The UT-4 transmitter can be used with a wide range of lavalier microphones, headset microphones and instruments (such as electric guitar or bass). The illustration below shows the wiring connections for its multi-pin input connector:



Samson Technologies offers the following pre-wired input accessory cables for the UT-4:

Part Number	Description
GC-1	Instrument cable, suitable for use with electric guitar or bass, etc. Terminates at standard 1/4" phone plug.
MC-1	Low-impedance microphone cable, suitable for use with most dynamic and condenser microphones. Terminates at standard 3-pin XLR plug.

We offer the following lavalier microphones, available pre-wired for use with the UT-4: Sony **ECM-44**, **ECM-55**, **ECM-77**; Sennheiser **MKE-2**; Audio Technica **831C**.

We also offer the following headsets, available pre-wired for use with the UT-4: AKG **C-410**; Audio-Technica **AT-71B**; and Countryman **IsoMax**.

For information about connecting other lavalier microphones and headsets to the UT-4, refer to the chart on the following two pages.

UT-4 Multi-Pin Wiring Chart

Manufacturer	Model No.	Pin 1	Pin 2
AKG	C409 Horn Mic	Shield	White/Clear
AKG	C410 Headset	Shield	White/Clear
Audio Technica	AT-831	Red (2x)	Yellow (2x)
Audio Technica	ATM-71	Red (2x)	Yellow (2x)
Audio Technica	ATM-75 Headset	Red (2x)	Yellow (2x)
Audio Technica	PRO8 Headset	N/C	Red (2x)
Audio Technica	MT-350	15K Ω Resistor to pin 2	White/Clear
Countryman	Isomax Headset	Red	Green
PSC	PSC/P6	Red	White
Samson	ECM-40	15K Ω Resistor to pin 2	White/Clear
Sanken	COS-11PT	Black	White/Clear
Sennheiser	MKE-2	Red	Blue
Sennheiser	MKE-2R (Red Dot)	Red	8.2 K Ω Resistor to pin 1
Sennheiser	MKE-40	Red	Blue
Shure	SM10A	N/C	Red
Sony	ECM-44	Red	White/Clear
Sony	ECM-55	Red	White/Clear
Sony	ECM-77	Red	White/Clear
Sony	ECM-144	15K Ω Resistor to pin 2	White/Clear
High Impedance Guitar	GC-1/P6	N/C	N/C
Low Impedance Guitar	MC-1/P6	N/C	N/C
Keyboards	GC-1/P6	N/C	N/C
Pin Information		+9 VDC	Audio

UT-4 Multi-Pin Wiring Chart

Pin 3	Pin 4	Pin 5	Pin 6
N/C	N/C	N/C	Red
N/C	N/C	N/C	Red
15K Ω Resistor to pin 2	N/C	N/C	Shield
15K Ω Resistor to pin 2	N/C	N/C	Shield
15K Ω Resistor to pin 2	N/C	N/C	Shield
N/C	N/C	N/C	Yellow (2x) Shield
N/C	N/C	N/C	Shield
N/C	N/C	N/C	Shield
N/C	N/C	Jumper-to-pin 2	Shield
N/C	N/C	N/C	Shield
Jumper-to-pin 2	N/C	Jumper-to-pin 6	Shield
Jumper-to-pin 2	N/C	Jumper-to-pin 6	Shield
N/C	N/C	N/C	Blue & Shield
Jumper-to-pin 2	N/C	Jumper-to-pin 6	Shield
N/C	N/C	N/C	Black & Shield
Jumper-to-pin 2	N/C	N/C	Shield
Jumper-to-pin 2	N/C	N/C	Shield
Jumper-to-pin 2	N/C	N/C	Shield
N/C	N/C	N/C	Shield
N/C	Audio	N/C	Shield
N/C	N/C	XLR-2 (Audio)	XLR-1 & 3 (GND)
N/C	Audio	N/C	Shield
Ground Bipolar	Hi-Z Audio	Mic Lo-Z	Ground Unipolar

NOTES:

- Resistors in plugs should be SMD (Surface Mount Device) or miniature type.
- Users of Sennheiser MKE-40: Add a 100pF capacitor between pin 2 and pin 5 only if necessary.

For more information, call Samson Technical Support at 1-800-372-6766.

About The DA-5H UHF Antenna Distribution Amplifier

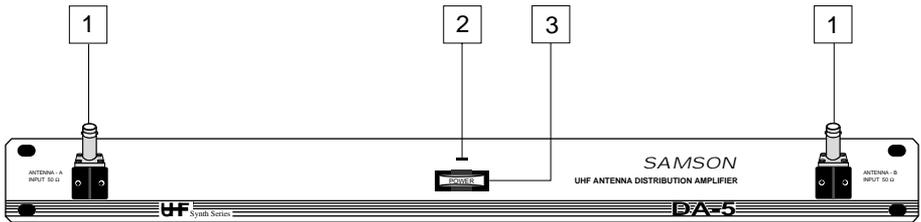
The Samson DA-5H UHF Antenna Distribution Amplifier is an optional component of the UHF Series system. The DA-5H allows up to four UR-4 UHF receivers to share the same pair of antennas.* It facilitates faster, more compact setups by reducing the number of antennas from eight to two while increasing the transmission range by adding 6 dB of RF gain for a stronger, quieter signal.

DA-5H features include:

- Two phantom powered front-panel antenna inputs (one for channel A and one for channel B).
- Eight rear-panel antenna outputs (four for channel A and four for channel B) which can be connected to up to four pairs of receiver antenna inputs using the supplied BNC connector kit.
- The addition of 6 dB of RF signal gain in order to provide a stronger, quieter signal and increase the effective transmission range.
- A front-panel power switch and power indicator LED.
- The DA-5H can accept any AC power voltage from 100 - 250 volts, without the need to change a voltage selector switch (our special current and voltage sensing circuitry does the job automatically for you).
- Rack-mountable in any standard 19" rack (taking only a single space), the DA-5H can easily be integrated into any traveling or fixed installation audio system.
- Rugged construction that ensures reliable operation in even the most demanding performance environments.

** Note that, even though the DA-5H allows multiple receiver antenna inputs to be shared, each receiver (and accompanying transmitter) in your UHF Series True Diversity wireless system must still be tuned to a discrete channel for multi-user operation.*

Guided Tour - DA-5H Front Panel

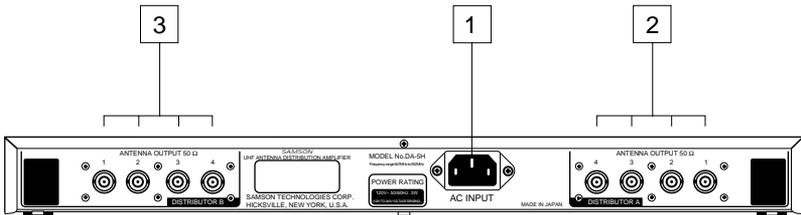


1: Antenna A and B mountings - Connect a pair of tuned coaxial antennas to these mountings. Use the antennas provided with your Samson UHF receiver, or, if unavailable, substitute the following antennas only: Samson Part Number **ANT 950**. Third-party antennas should *not* be substituted. These antenna mountings are phantom powered; take care not to short them. See the section in this manual entitled “Setting Up and Using the DA-5H” (on page 29) for information about antenna installation and positioning.

2: “Power” LED - This is lit whenever the DA-5H is powered on.

3: Power switch - Use this to turn the main power on and off. When the DA-5H is on, the “Power” LED (see #2 above) will be lit.

Guided Tour - DA-5H Rear Panel



1: AC input - Connect the supplied standard 3-pin “EEC” plug here. The DA-5H contains an automatic current and voltage sensing circuitry and so can accept any mains current from 100 - 250 volts without the need to set a selector switch. The AC outlet used for powering the DA-5H *must* be grounded. See the “DA-5H Grounding Techniques” section on page 31 of this manual for more information.

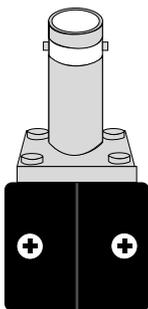
2: Antenna Output (Distributor A) - Use the supplied BNC connectors to connect each of these antenna outputs to the “Antenna A” inputs of your receivers. For more information, see the section in this manual entitled “Setting Up and Using the DA-5H” (on page 29).

3: Antenna Output (Distributor B) - Use the supplied BNC connectors to connect each of these antenna outputs to the “Antenna B” inputs of your receivers. For more information, see the section in this manual entitled “Setting Up and Using the DA-5H” (on page 29).

Setting Up and Using the DA-5H

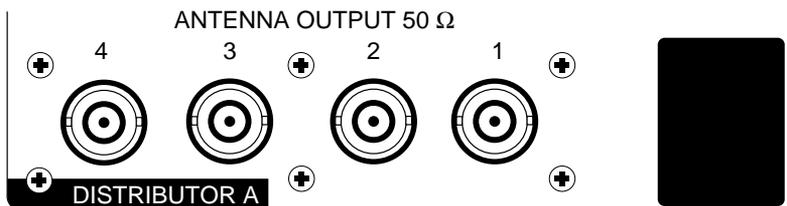
The basic procedure for setting up and using your DA-5H UHF Antenna Distribution Amplifier takes only a few minutes:

1. Remove all packing materials (save them in case of need for future service) and mount the DA-5H into your rack. Turn off the power to your audio system and all wireless components.



2. Mount a tuned coaxial antenna from your UHF receiver* into the DA-5H front-panel “Antenna-A” input by inserting it into the BNC connector (this connector is “keyed” so that you may have to rotate the antenna slightly until it drops all the way down into the seating). Then twist the outer ring of the antenna clockwise until it clicks into place. Repeat the same procedure in order to mount the other antenna into the front-panel “Antenna-B” input. Note that both antenna inputs are phantom powered; take care not to short them.

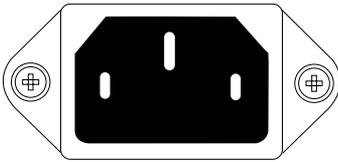
3. Using the supplied BNC connectors, make a connection between the rear-panel Antenna Output 1 (Distributor A) and the “Antenna A” input of the first UHF receiver in your system. Then make a connection between the rear-panel Antenna Output 1 (Distributor B) and the “Antenna B” input of the first UHF receiver in your system. Repeat this procedure as necessary to connect the other DA-5H Antenna Outputs to the “Antenna A” and “Antenna B” inputs of up to three additional receivers.



* *Third-party antennas should not be substituted.*

Setting Up and Using the DA-5H

If necessary, longer runs of standard low-capacitance (50-ohm) coaxial cabling with BNC connectors can be substituted for the supplied cables. **Note that, even though the DA-5H allows receiver antenna inputs to be shared, each receiver (and accompanying transmitter) in your system must still be tuned to a discrete channel for multi-user operation.**



4. Connect the supplied 3-pin “EEC” plug to the rear panel AC connector and plug the other end into any grounded AC socket (see the “DA-5H Grounding Techniques” section on page 31). Then depress the front-panel power switch to turn the unit on. The “Power” LED will light up.

5. Turn on the power first to all connected wireless components and then to your audio system. Now we recommend you do a walkaround in order to make sure that coverage is provided for your entire performance area. With all transmitters unmuted, and the level of your audio system set as before, have an assistant walk through the entire area that will need to be covered while speaking, singing, or playing into each transmitter at a normal performance level. The presence of the DA-5H should serve to increase the effective transmission range within your system—if you do find that any new “dead spots” result instead, try changing the angle of the DA-5H antennas. The basic rule of thumb for all wireless audio systems is to always try to minimize the distance between transmitter and receiver as much as possible and also to try to maintain “line of sight” between the two (that is, the person using the transmitter should be able to see the receiver antennas). The idea is to ensure that the strongest possible signal is received from all planned transmission points. In fixed installations such as A/V or corporate conference rooms or for extended range applications (where the transmitters and receivers are more than 150 feet apart), it may be desirable to remote the DA-5H antennas altogether by using standard BNC connectors and 50 ohm coaxial cabling that is suitable for up to 1 gigaHertz bandwidth usage.

If you have followed all the steps above and are still experiencing difficulties, call Samson Technical Support (1-800-372-6766) between 9 AM and 5 PM EST.

DA-5H Grounding Techniques

The DA-5H contains a switching power supply that will add an audible hum to your audio signal if the unit is not plugged into a properly grounded three-pin AC socket. Unless you're using a "star ground network" (see below), you must **not** use an adapter to lift the ground from the DA-5H AC cable.

If the DA-5H is correctly connected to a grounded three pin socket and you still experience hum or buzz when using it with other audio devices, there's a simple test to determine the source of the problem: with all devices powered on and connected with audio cabling, physically remove each device, one by one, from the rack. If the hum disappears when a particular device is removed, you'll know that that device is the culprit. If the offending device uses a two-prong plug (or an external two-prong AC/DC adapter), you can try reversing the plug in the socket. If that doesn't work, you may need to physically ground that device's chassis by connecting a wire (called a *strap*) from it to a grounded piece of metal such as rack ears. Some pieces of equipment have a screw-type ground post to which the strap can be connected; if not, you can attach some kind of metallic binding post to the case itself.

In addition, you can minimize possible interference by planning your RF antenna, audio, electrical, and computer cable runs so that they are as far apart from one another as possible and so they don't run parallel to one another. If they have to cross, try to ensure that they do so at a 90° angle (that is, perpendicular to one another). In particular, try to keep audio cabling away from external AC/DC adapters

If you're using the DA-5H in a fixed installation, you may want to invest the time and money into creating a *star ground network* for all your audio devices. This is by far the best technique for avoiding grounding problems. It involves using a formidable ground source such as a cold water pipe or a copper spike driven into the earth. A thick grounding cable is connected to that source and is then brought to a central distribution point; from there, individual cables are connected to each piece of equipment. This setup also requires that you lift the ground plug of all three-prong AC connectors, so there is the possibility of danger if it is done incorrectly. We strongly recommend that you contract with a qualified professional to carry out this or any kind of electrical work.

Glossary of Terms

Audible - A sound that we can hear, generally in the 20 Hz - 20 kHz frequency range.

BNC - Short for "British Naval Connector." A standard RF antenna connector used by many wireless receivers, including the Samson UR-4.

Carrier - An inaudible high-frequency radio signal that is continuously *modulated* by an audible signal (it therefore is said to "carry" the audible signal).

Channel - In wireless transmission, refers to a particular radio frequency.

Demodulation - In FM transmission, the process of removing the carrier signal and thereby restoring the original audible signal.

Frequency - Refers to the number of wavecycles occurring per second. Audible frequencies are in the range 20 Hz - 20 kHz; radio frequencies are considerably higher.

Frequency Modulation (FM) - A form of radio transmission by which the frequency of a *carrier* signal is continuously *modulated* by the *audible* signal to be transmitted. A receiver then *demodulates* the signal by removing the carrier signal so that the original audible signal is restored.

Group - In wireless transmission, refers to a selected set of radio frequencies.

Headset - A "hands-off" microphone worn with a headband.

Hertz (Hz) - A unit of frequency measurement denoting one wavecycle per second.

Inaudible - A sound that we cannot hear. Radio waves (which have frequencies ranging from the tens of thousands to millions of waves per second) are all inaudible.

KiloHertz (kHz) - A unit of frequency measurement denoting one thousand wavecycles per second.

Ladder - Refers to a multi-segment meter, where the number of segments that light are proportional to the strength of signal.

Lavalier - A "hands-off" clip-on mini-microphone.

MegaHertz (MHz) - A unit of frequency measurement denoting one million wavecycles per second.

Modulation - The process by which one signal is continuously affected by another. The Samson UHF Series system utilizes *frequency modulation*, whereby the frequency of a carrier signal is continuously modulated by the audible signal to be transmitted.

Noise Reduction - A process by which the level of extraneous noise or hiss in a signal is reduced considerably. The Samson UHF Series system utilizes the dbx® system of noise reduction.

Glossary of Terms

Receiver - A component that receives a modulated radio signal and restores the original audible signal by utilizing demodulation.

RF - Short for "Radio Frequency."

Transmitter - A component that transmits an audible signal by causing it to modulate a high-frequency inaudible carrier signal.

True Diversity - A wireless reception system by which a single chassis houses two discrete receivers, with both tuned to the same frequency but with each using an independent antenna. A built-in computer chip then continuously scans the two receivers and determines which one has the clearest and strongest reception, automatically (and silently) switching to that channel.

UHF (Ultra High Frequency) - Refers to radio waves in the 300 - 3,000 megaHertz range.

VHF (Very High Frequency) - Refers to radio waves in the 30 - 300 megaHertz range.

VU - Short for "Voltage Unit." A unit of measurement utilized by audio devices that denotes relative signal strength. 0 VU is generally taken to indicate unity gain (no boost or attenuation).

Wave - Refers to the transference of energy in a regular, back-and-forth vibration.

Wavecycle - One single backwards-and-forwards motion of a wave.

Specifications

Transmitter RF:

Number of Channels	Six
Channel Frequencies	
Channel A-1	947.125 Mhz
Channel A-2	947.375 Mhz
Channel A-3	948.375 Mhz
Channel A-4	950.000 Mhz
Channel A-5	951.125 Mhz
Channel A-6	951.875 Mhz
Type of Emission	110KF3E FM
RF Output Power	Max. 50 mW
Antenna Type	1/2 λ whip
Gain (Audio)	Less than 2.14 dB
Spurious Emissions	Less than -43 dB from carrier
Carrier Generation	Crystal controlled PLL oscillator
Stability	50 ppm
Operating Range	300 ft. - 1500 ft.
Battery Life (9-volt alkaline)	Approximately 4 - 6 hours
Weight (UH-4, without mic element)	111 g

Transmitter Audio:

Audio Frequency Response	50 Hz to 15 kHz \pm 3 dB
Frequency Deviation	15 kHz (@ -40 dBV)
Pre-emphasis	50 micro/sec.
Noise Reduction System	dbx type II
Audio Residual Noise	Less than -94 dBm (@ IHF - A Filter Weighted)
Audio Dynamic Range	More than 103 dB (@ IHF - A Filter Weighted)
Total Harmonic Distortion	Less than 1% (@ 1 kHz)

Specifications

Receiver:

Number of Channels	Six
Channel Frequencies	As per transmitter (see page 34)
Type of Reception	110KF3E FM
Signal Sensitivity	15 dB μ @ s/n 60 dB (Audio @ 1 kHz, deviation 20 kHz)
Internal Oscillators	Crystal controlled PLL, 2nd osc. XTAL
Stability	50 ppm
Spurious Rejection	-70 dBm (connected to antenna terminals)
Antenna Terminals	50 Ω , connector BNC, powered 9VDC 25 mA max.
Antenna Type	1/2 λ sleeve (dipole)
Bandwidth (Selectivity)	\pm 150 kHz @ 60 dB
Total Harmonic Distortion	Less than .5% (400 Hz, deviation @ 10 kHz)
Weight	2.9 Kg

DA-5H:

Frequency Range	947 MHz - 952 MHz
Antenna Input	Distributor A x 1, Distributor B x 1 50 ohms, BNC-J connector, Phantom Power DC 9V / 25 mA (Max.)
Antenna Output	Distributor A x 4, Distributor B x 4 50 ohms, BNC-J connector
Gain	0 dB \pm 2.5 dB
NF	Less than 10 dB
Maximum Input	110 dB μ V
Operating Temperature	0° C to +50° C
Power Rating	AC 120 V, 50/60 Hz, 3 W (Voltage Sensing 100 V - 240 V)
Dimensions (W x H x D)	482 x 44 x 146 mm (excluding connector, knob, rubber feet, power cord)
Weight	Approx. 2.0 Kg
Accessories	EEC power cord, BNC connector kit

FCC Rules and Regulations

Samson wireless systems are type accepted under FCC rules parts 90, 74, and 15. Licensing of Samson equipment is the user's responsibility and licensability depends on the user's classification, application and frequency selected.

Produced by *On The Right Wavelength* for Samson Technologies Corp.

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Printed April, 1995

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