LECTROSONICS, INC.
581 Laser Rd NE Rio Rancho, NM 87124
(800) 821-1121 (505) 892-4501 Fax (505) 892-6243
Email: sales@lectrosonics.com Web: http://www.lectrosonics.com

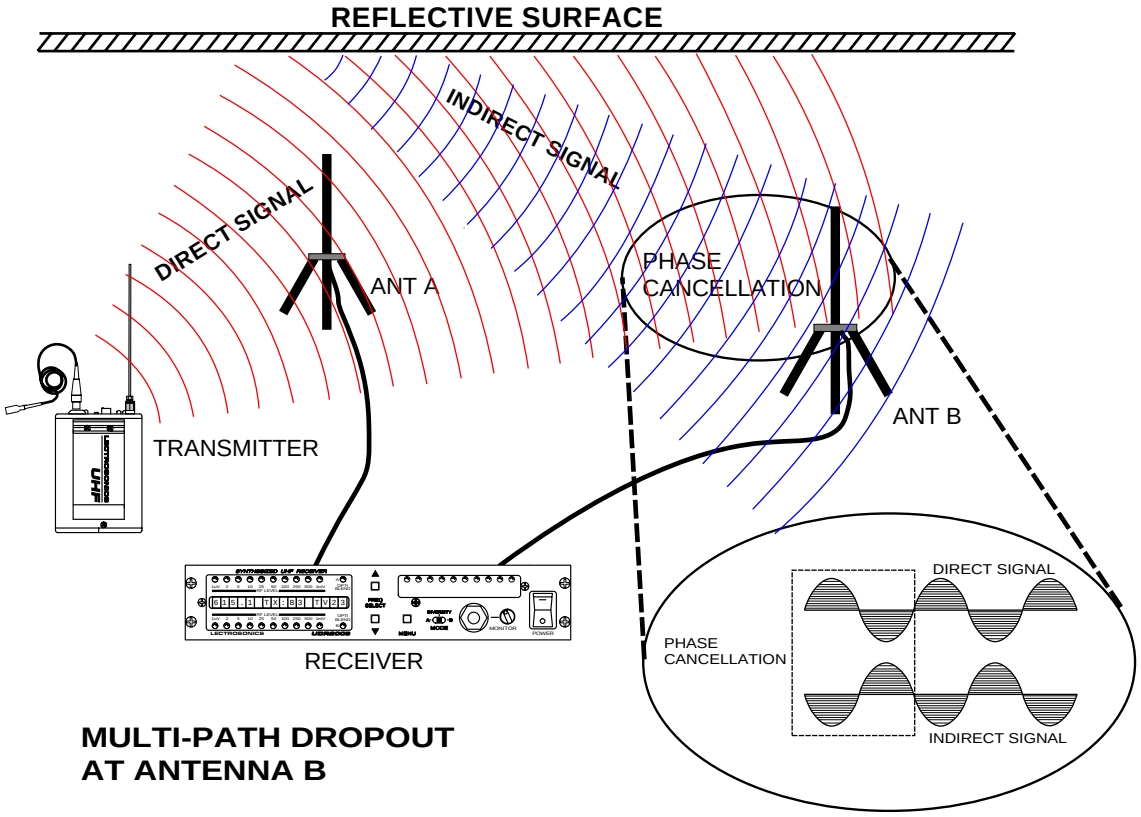
Tech Notes
#TN1016

Wireless Drop-outs and Noise-ups

You have everything set up and connected. Frequency coordination has been done and you're performing a sound check from the stage. As the talent moves across the stage with the wireless mic in operation you hear a "phffft" or maybe a "swisshhh" from the wireless system. You have a drop-out problem. No, not the high school variety, but rather a type of RF signal degradation that causes the desired signal to drop way down in strength to the point where the noise floor rises up high enough to be heard.

WHAT CAUSES DROP-OUTS?

A wireless transmitter sends out a radio signal in all directions. This signal will often bounce off nearby walls, ceilings, etc. and a strong reflection can arrive at the receiver antenna along with the direct signal. If the direct and reflected signals are out of phase with each other at the receiver antenna, a cancellation may occur, resulting in a drop-out. A drop-out sounds like either audible noise (hiss, swish, pop, etc), or in severe cases, may result in a complete loss of the RF carrier and the sound when the transmitter is positioned in certain locations in the room. A VHF drop-out normally sounds like hiss or a swishing sound. UHF dropouts are more brief due to the shorter wavelength, sometimes sounding like click or pop. Moving the transmitter even a few inches will usually change the sound of the drop out, or even eliminate it. A drop-out situation become either better or worse as a crowd fills and/or leaves the room, or when the transmitter or receiver is operated in a different location.



MULTI-PATH DROPOUT AT ANTENNA B

WHAT CAN I DO TO GET RID OF DROP-OUTS?

In non-diversity systems (one antenna) the best way to get rid of dropouts is to reposition the receiver antenna so that it is as close as possible to the transmitter. Be sure the transmitter antenna has a line of site shot to the receiver antenna. Many times, simply moving the receiver or transmitter antenna a few inches or even three to four feet will cure the problem.

Diversity systems (two antennas) were developed to attack this particular problem. If one antenna is receiving two signals which are out of phase with each other causing a dropout, chances are good that the other antenna on the diversity receiver is receiving a good solid signal. There are several different types of diversity receiver designs used by various manufacturers. Some of them switch antenna phase, others alternate between two different receivers, and others use non-switching, panning circuitry to blend the audio outputs of two receivers. Circuits in the receiver will automatically decide which antenna is receiving the best signal and either switch to that antenna, or pan toward the stronger signal. If conditions cause the multi-path problem to move to the other antenna, the receiver will automatically switch over maintaining a good audio signal at its output.

Even diversity receivers can be susceptible to drop-outs. Be sure to position the antennas at least three or four feet apart and so that they are not within 3 or 4 feet of large metal surfaces. If this is not possible, try to position the antennas so that they are as far away from metal surfaces as is practical. It is also good to position the receiver so that there is a direct line of sight between the transmitter and the receiver antenna. In situations where the operating range is less than about 100 feet, the antenna positioning is usually less critical, since the overall RF signal level is generally higher. The antennas can also be configured with one whip mounted directly onto the receiver, and the other one mounted remotely. Lectrosonics builds VHF and UHF receivers with a sophisticated diversity design called “Opti-blend Ratio Panning,” which overcomes drop-out problems in almost any imaginable situation.

In the event that you do encounter a drop-out problem, first try moving one antenna to a new location at least 3 or 4 feet from where it was. This may alleviate the drop-out problem on that antenna. If drop-outs are still a problem, try moving the antenna to an entirely different location in the room or moving one or both antennas closer to the transmitter location. By observing the OPTI-BLEND LEDs on the front panel of a Lectrosonics ratio diversity receiver, you can determine which antenna is suffering weak signals.

Lectrosonics transmitters radiate power very efficiently, and the receivers are very sensitive, which reduces drop-outs to an insignificant level. If, however, you do encounter drop-outs frequently, call the factory or consult your dealer. There is probably a simple solution.