

Tips for Acheiving Optimal Performance

Recognizing Interference

The ways of recognizing the type of interference present are observing the RF LED indications and carefully listening to the audio output. A set of headphones can be a useful tool in isolating and analyzing interference problems. With headphones it is easier to listen to one wireless channel at a time, even when the system is in use.

Below are some interference descriptions. Most likely there is one that matches the symptoms that you are experiencing.

- If there is interference when the microphones are off, and noise/distortion is present from the receiver output when the microphones are on, try turning off all other wireless microphones. If the interference problem is still present, there might be a direct radio interference problem. Direct interference is a serious problem that must be corrected in order for the wireless system to be fully usable.
- Interference in the form of low level-audio tones, whines, whining sounds whose pitch changes rapidly, or audible voices or music (distorted or not) is likely to be caused by intermodulation, non-wireless interference or direct interference.
- If there is interference when the receiver is turned on, in the form of buzzy or raspy whines with a distinct cadence or rhythm that differs from time to time, digital interference might be the problem. Common sources include computers, digital delays, effects processors, lighting controllers, and other digital equipment using microprocessors and digital signal processors (DSPs).
- If there is no interference when the receiver is turned off and irregular popping, cracking or buzzing noises on the audio with the receiver on, there may be electrical interference problems. This kind of interference is usually caused by electric motors, neon lights, lighting equipment, appliances and other types of electrical equipment. Electrical interference will generally affect all wireless systems at a location, not just one system.
- Certain types of buzzing sounds are actually due to interference from TV stations. If the buzzing sound changes substantially at more or less random intervals and does not seem to be caused by electrical equipment, the problem may be TV interference.
- Interference that takes the form of bursts of static or short bursts of noise is likely to be caused by lightning, intermittent arcing or defective electrical machinery. This type of random interference is pretty rare but can be among the most difficult to resolve.

If none of the descriptions match your particular problem, or the information is unclear, see the "Types of Interference section" below. Your authorized dealer may also be able to offer assistance and might be familiar with any unusual local conditions that could be affecting the problem. If your dealer is not able to assist, owners of VocoPro equipment can obtain telephone support at 800-678-5348 9A-5P M-F Pacific Time.

Avoiding Basic Problems

Sometimes interference problems have very basic causes. To avoid wasting time on an easily correctable problem, check the following items before proceeding:

- Make certain than no radio transmitters are allowed to come closer than approximately 10 to 15 feet of the wireless receiver antennas. This can overload the receiver and increase the chances of interference.
- Make certain not to allow receiver antennas to touch each other when arranging them. Be sure that the antennas from one receiver do not touch, or come too close to, those of another receiver. Try to provide at least 10 inches of separation between the antennas of any two receivers.
- Make sure that all microphones have charged batteries. The low output voltage of weak batteries can cause some microphones to generate harmful interference. If there is any doubt, install fresh batteries in all microphones.
- Make sure that the wireless frequencies are not on a local TV channel.
- Check the wireless frequencies in use to make sure that no two systems are on the same frequency.
- Check to make sure that no two wireless frequencies are too close together. In general, 1 MHz is the recommended minimum spacing between systems.
- If a considerable number of systems will be used, operating conditions will be difficult or interference is likely, if possible avoid these situations.
- Before using a system in a new location or another city, double-check for new problems. Small changes in conditions can cause interference where none was present before.
- Turn off unnecessary electronic equipment, especially computers and digital devices. These are a relatively common cause of wireless interference.
- If use of computers or digital devices is necessary, keep them at least 18 inches (45 cm) away from the microphones and receiver antennas.

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Frequency Conflicts

There are two primary ways that other VHF wireless systems and TV channels cause interference. The first is a direct frequency conflict. If two VHF wireless systems are on the same frequency, usually neither system will be usable unless the other is turned off. This problem is more common than might be expected, especially when all the equipment is the same type. This is because most systems have only a limited number of standard frequencies. It should be remembered that the other systems could be some distance away - in another house of worship down the street, in another nearby studio, or at another club in the vicinity.

TV transmitters can also be a powerful source of direct interference if the wireless frequency falls within the assigned channel of a local TV station. This problem sometimes occurs because wireless frequencies are listed in MHz and it is not always obvious within which TV channel a particular frequency falls. For reference, below is TV frequency information.

TV Channel Frequency Data VHF TV Channels

Channel	Number	Frequency Range (MHz)	Picture Carrier Frequency (MHz)	Color Subcarrier Frequency (MHz)	Sound Subcarrier Frequency (MHz)
7	174 - 180	175.250	178.8295	179.750	
8	180 - 186	181.250	184.8295	185.750	
9	186 - 192	187.250	190.8295	191.750	
10	192 - 198	193.250	196.8295	197.750	
11	198 - 204	199.250	202.8295	203.750	
12	204 - 210	205.250	208.8295	209.750	
13	210 - 216	211.250	214.8295	215.750	

NOTE: The low VHF TV channels (2 through 6) are not used for wireless microphones and do not need to be considered

Troubleshooting

<p>No sound output, RF LED not glowing</p>	<ul style="list-style-type: none"> -Make sure the microphone and receiver power switches and receiver are set to the ON position. -Check microphone batteries to ensure that they are providing sufficient power. Replace battery if necessary. -Check receiver's AC power connection. Make sure antennas are firmly connected and extended to an optimal position. -If necessary, reduce the distance between the microphones and receiver. -Turn up the receiver's VOLUME level controls. -Check for proper connection between receiver and external amplifier/mixer. -Talk into the microphone and observe the receiver's RF signal LED's. If they glow, the problem is elsewhere in the sound system.
<p>Received signal is noisy or contains extraneous sounds with the microphone(s) ON</p>	<ul style="list-style-type: none"> -Check microphone(s) batteries and replace if charge is low. -Remove local sources of RF interference, such as lighting equipment. -Signal may be too weak. If so, reposition antennas. (If possible, move them closer to the transmitter). -Adjust the squelch application to the microphone channels in use.
<p>Noise coming from the receiver with the microphones turned OFF</p>	<ul style="list-style-type: none"> -Remove local sources of RF interference, such as lighting equipment. -Reposition the receiver or antennas.
<p>Momentary loss of sound as microphone(s) are moved throughout the operating range.</p>	<ul style="list-style-type: none"> -Reposition the receiver and perform a "walkthrough" and observe the signal strengths. If audio dropouts persist, mark these "dead spots" in the operating area and avoid them during the performance.

Specifications

TECHNICAL DATA

RF Carrier Frequency Range: VHF 174.2~215.8MHz

Total Harmonic Distortion: < 0.7% (+15 kHz deviation, 1 kHz modulation)

Frequency Response: 50 Hz~15, ± 2dB

Audio Output Level: ± 15 kHz deviation, 1 kHz tone, (1/4" connector into 3k load): -8.8 dBV (Hi-Z)

Temperature Range: -10~50° C

Sensitivity Range: Approximately 300-ft (100m) under typical conditions

Power Supply: Receiver: AC 120V/50 Hz, Mics: 2 x 1.5V alkaline batteries

Power Consumption: 18-24V

Current Drain: Transmitter: 35mA average (40mA max), Receiver: 180mA average (200mA max)

Operating Temperature Range: -4 to 122 degrees Fahrenheit. Battery dimensions may limit this range.