

## Frequently Asked Questions

### • 2.4 GHz DIGITAL Wireless Audio Transmitter / Receiver, Model 1000

**Q: What is the difference between the Amphony 2.4 GHz Digital Wireless Audio Transmitter / Receiver and current 900 MHz or 2.4 GHz analog audio transmitters ?**

**A:** The main difference is how the audio signal travels from the transmitter to the receiver. Almost all of the current wireless systems on the market use a method called FM (Frequency modulation) which is very similar to the operation of your FM radio. The major drawback is that this type of modulation is 'analog' which is the reason for the poor performance of analog transmitters.

If you listen carefully to a CD over an analog wireless audio transmitter / receiver, you will notice significant noise/static, low signal dynamics and low channel separation. Also, the signal quality will vary when you move around the room between the transmitter and receiver (the noise will increase locally and also the further the receiver is moved away from the transmitter).

Our transmitter / receiver uses something which is called 'digital' modulation. The same way music is recorded on a CD using 1's and 0's, it is transmitted as 1's and 0's to the receiver. The result of this technology is that there is no audio quality degradation during transmission, i.e. you will hear the exact same audio quality as you would if the equipment was connected by a cord.

Because of this digital technology, our transmitter / receiver is very suitable for high-quality audio, such as music coming from a CD, DVD, digital satellite receiver etc.

**Q: Can the receiver connect to loudspeakers ?**

**A:** The receiver does not contain a power amplifier and therefore cannot be connected directly to loudspeakers. The receiver can connect to active speakers, amplifiers and other audio equipment that have a standard high-impedance analog audio input. For direct connection to loudspeakers, we recommend our Model 1520 and Model 1550 transmitter / amplifiers.

**Q: How does the transmitter connect to my audio equipment?**

**A:** The transmitter connects to any standard audio line output via the supplied stereo RCA audio cable. In cases where no line output (RCA audio out) is available, the transmitter can also connect to other audio outputs via appropriate adapters which are not supplied with the product. By using a Y adapter which has either a 3.5 mm or a 6.3 mm audio plug on one side and 2 RCA plugs on the other side, the transmitter can be connected to headphone outputs. Please note that most headphone outputs can be adjusted in volume. It is important that any adjustable outputs be set such to the level which yields the highest volume at the headphones without clipping (distortion).

**Q: Does the transmitter connect to the amplified speaker output of my surround sound receiver?**

**A:** The transmitter cannot be connected to an amplified speaker output. For this application, we recommend the Model 1520 and Model 1550 transmitter / amplifiers.

**Q: Is the technology used similar to Bluetooth or MP3?**

**A:** Even though both our transmitter / receiver and Bluetooth / MP3 use digital audio, there is a fundamental difference between Bluetooth and how audio is transmitted by our transmitter. Bluetooth is only able to transmit audio data at very low data rates reliably (typically up to 200 kbps). Therefore, only compressed audio can be transmitted via Bluetooth. A commonly used technique to compress audio data is MP3. Our transmitter, however, does not compress the audio and transmits the full bit rate. As a result, the audio quality is not degraded such as with MP3. Also, the audio latency (audio delay) of MP3 compressed audio is fairly high and thus not suitable for television or video applications. Since our transmitter does not compress the audio and since only a minimum of data buffering is used, the audio delay is minimal.

**Q: What is Forward Error Correction and why is it used by the transmitter / receiver ?**

**A:** Occasionally, there may be some data which is corrupted during transmission. This may be the case when there is interference, such as other transmitters, electrical sparks or if you move around and the signal is temporarily lost. Forward Error Correction as it is used by the transmitter / receiver can in most cases repair the data which is received to guarantee 100% correct data reception and therefore 100% correct audio reception.

This technology is in part responsible for the high robustness of the transmission. With analog audio transmitters you may have noticed 'clicks' or 'pops' during sparks which often occur when switching on appliances.

**Q: What does the noise shaping filter do which is part of the audio receiver ?**

**A:** Digital audio, such as audio on a CD and the audio transmitted to the receiver, is represented by numbers that represent voltage levels. When analog audio is converted to digital audio, the voltage of the audio signal is sampled and represented by a number that refers to the voltage that comes closest to the actual voltage. Because there is usually a small difference between that voltage and the actual voltage of the analog audio signal, a certain amount of noise - quantization noise - is introduced. The amount of such quantization noise is, among other things, determined by the amount of information that is used to represent each sample - resolution. Therefore, digital audio on a CD and audio transmitted to the receiver always contains a small amount of quantization noise which limits the maximum possible signal-to-noise ratio of the transmission. In order to increase the signal-to-noise ratio beyond that limit, the receiver features a special noise shaping filter which is a 5th-order filter that outputs the audio at 64 times the sampling frequency and shifts the audio data quantization noise to higher frequencies that are outside of the audible frequency band. As a result, the receiver is able to achieve a higher signal-to-noise ratio than would be possible without a noise shaping filter.

**Q: Can this transmitter / receiver be used to transmit surround sound to rear speakers ?**

**A:** Yes. In this case the transmitter needs to be connected to the two rear speaker channels of your surround-sound decoder. Some surround-sound decoders do not offer RCA line audio outputs for the rear speakers. In this case, we recommend the Model 1520 and 1550 transmitter / amplifiers. Please note that the receiver cannot be directly connected to passive speakers.

**Q: What are the benefits of transmitting the full data rate without using audio compression ?**

**A:** Since our transmitter transmits a data rate of over 3 Mbps (3 million bits per second), the audio can be transmitted without audio compression. Also, forward error correction can be used. The reason that other systems use audio compression is to reduce the extremely high data rate of a pure (uncompressed) audio signal in order to either be able to store that signal or transmit that signal more easily.

The biggest drawback of using audio compression is that the quality of the audio signal is reduced, such as in MP3-compressed audio. This is because audio compression removes parts of the music. Some types of music which are particularly difficult to compress without noticing audio degradation. Systems using audio compression are not able to deliver CD-quality audio.

**Q: Will my 2.4 GHz cordless telephone or wireless LAN affect the operation of the transmitter / receiver or vice versa ?**

**A:** While the transmitter will normally not affect the operation of a 2.4 GHz cordless telephone or wireless LAN, the receiver may mute while the telephone or wireless LAN is being operated. The range of the transmitter may also be affected during the operation of other 2.4 GHz equipment. If you do operate a 2.4 GHz cordless telephone or wireless network close to the receiver, we recommend that you purchase one of our 5.8 GHz models to eliminate any possibility of interference. Whether or not the receiver will be affected by other 2.4 GHz devices depends to a large degree on the type of equipment and the distance between such equipment and the receiver relative to the audio transmitter. Digital cordless telephones are more likely to cause problems than analog cordless telephones. The base station of certain types of cordless telephones, such as the Siemens Gigaset or Panasonic Gigarange series, will periodically broadcast signal beacons, even when the telephone is not in use, that may cause a clicking noise of the receiver. Walls located between such equipment and the receiver will in many cases attenuate an interfering signal enough for it not to cause any problems when operating the receiver. The receiver itself employs an error correction scheme and thus can tolerate interference up to a certain degree without any signal degradation. If interference is a problem and if there is no direct line-of-sight to the audio transmitter then the use of RangeBooster modules is recommended.

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Contacting Amphony Support

For contact details and Local Sales Representatives, visit the Amphony web site at:

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