Using a Tactical Headset with Cell Phone or other 3.5mm Compatible Device

During the Covid-19 pandemic, we created several configurations of our Tactical Headsets which are compatible with the ubiquitous 3.5mm "stereo" connection. We rushed to get these products created and configured to meet the need of front line healthcare professionals, and so the launch was, admittedly, a bit, well… *frenetic* for lack of a better word. We take full responsibility for this, but, in truth, the applications for a 3.5mm connector are so various and widespread, there is no true standard in the market place.

The 2-Way radio market already has communications solutions that are compatible with masks and some of the various PPE we are required to use these days. Getting these professional quality headsets able to be used with consumer-grade communications devices has caused some issues. With this tech bulletin, we try to put some better definition of what is available and how we have tried to meet the demand in our product marketplace and the newly emerging requirements.

3.5mm BASICS

The generic 3.5mm connector sometimes called a "stereo" connector which is an artifact of the PC headset world, gets its name from the diameter of the single pin connection used to plug into a PC or any other sound devices. It has become possibly the most universal headset connection in the world, and you will also see it on most commercial airplanes for the passenger in-flight headset connection. This single pin connector resembles its little brother, the 2.5mm, but the 2.5mm is much less widely used. It should also be stated that the 3.5mm connection is a *consumer*-grade solution. It is not meant for rough duty and is by no means a watertight connection.

Most people think every 3.5mm connector is following the same standard, but they are not. Have faith though, there is some consolidation going on. For example, on older Android or Samsung devices, the conductor assignments (sometimes referred to as Tip-Ring-Ring-Sleeve or TRRS) were different from the iPhone and PC. Most newer devices are beginning to converge on the same assignment, which is: Tip = L Spkr+, Ring 1 = R Spkr+, Ring 2 = GND, Sleeve = Mic+. For mono devices, L Spkr and R Spkr get the same audio input. There is also a "newer" TRRRS with 5 conductors, but it is much less common, so let's ignore it for now.

Wikipedia has created a nice and simple page that covers many of the current usages you will see. https://en.wikipedia.org/wiki/Phone_connector_(audio)#TRRS_standards

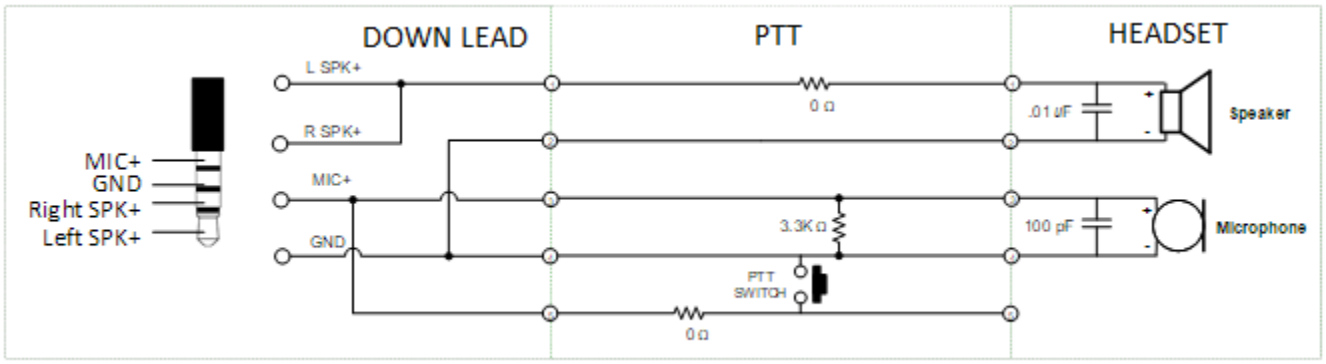

Figure 1: 3.5mm diagram connection (Wikipedia)

At coedRED, instead of creating a completely new device, we decided to take our existing MODULAR family of headsets and design a 3.5mm down lead to easily adapt our proven technology to the emerging needs of the community. By purchasing the down lead you can use your existing headset with your 2-Way radio one day, and use it with your phone or PC the next.

CELL PHONE vs 2-WAY RADIO AND PTT FUNCTION

This is where 2 or more worlds collide. 2-Way radios operate differently than cell phones or telephones. One of the hallmark features of a 2-Way radio is the ability for a large group of users to monitor a live discussion without accidentally interrupting the flow of information. The use of a Push To Talk button (PTT) makes the act of breaking into the conversation a deliberate action: you have to "positively" choose to contribute your voice to the ongoing conversation. This is different from a phone call, or, as most of us are acutely aware these days, a Zoom call video conference. The microphone on a phone call is typically "live" at all times.

The PTT function on a 2-Way radio is often misunderstood. Many people think it works like one of the consumer-grade headsets for your cell phone, there is a simple inline switch in the microphone circuit that allows current to flow through the mic thereby allowing it to transmit. For a 2-way radio, there is a separate circuit, a fifth conductor that tells the radio

to transmit the microphone. Think of it this way: the microphone is always live, but the PTT activation tells the radio when to transmit. This functionality also allows your radio to operate in Voice Activated (VOX) Mode.

The standard 3.5mm connector has 4 circuits, while a typical 2-way radio connection needs 5 unique circuits. This difference makes using a 2-way radio headset with a cellular phone a little different. This subject gets more confusing when you consider some of the newer "Push To Talk over Cellular" (PoC) apps available for many devices these days.

PTT FUNCTION and PTT BYPASS on codeRED PRODUCTS

Now we get a little more complicated. PTT functionality is new to cell phone manufacturers and app creators. Throw Blue Tooth protocols into the mix and you really have a lot of "degrees of freedom". Since no OEM likes to talk to another, we have ended up with various solutions to the same problem. This has left us, the users, to figure it all out. Someday I am sure there will be standardization, like with the gas/brake/clutch pedals on an automobile, but today is not that day. All we can do is test it out and report back how manufacturers are handling the electrical or software inputs their device receives.

Let's start this discussion off with the most popular handheld device on the planet, the iPhone. Say what you will about Steve Jobs and Apple in general, but they are responsible for much of the PC and cellular phone standardization we have these days. And standardization is a *good* thing. If you do not believe me, try using your parent's Commodore 64 or 286x PC running DOS. The Apple iOS relegated these devices to the landfill.

When using a codeRED headset with PTT and 3.5mm down lead on an **iPhone** the mic is always live, the speakers are always live. The PTT will allow you to answer a call, hang up a call, pause your music, restart your music. Pressing it twice quickly will skip to the next song. If you press and release it, it will work as a PTT in many of the PoC apps. Press and release it again to mute the mic. If you prefer not to use the PTT, we have created a PTT bypass that allows you to connect your headset directly to the 3.5mm down lead. If you purchase the headset with the 3.5mm option, you will receive both the PTT and the PTT bypass.

The **Android** devices operate pretty much the same as the iPhone. There is one exception. A company called **Sonim** makes a "hardened" Android device which is like the old Nextel phones. It is a "smart" phone but has PTT functionality built into it. The Sonim device has a PTT button and uses a multi-pin connection for headsets and accessories. Although we do not currently make any Sonim compliant headsets, there is an adapter available that converts the Sonim to a standard 3.5mm connection. When using this adapter, our 3.5mm headsets will work as a normal headset except the mic will not be live. To activate the mic you will need to press the PTT button on the radio or use a blue tooth external PTT, like our PTT-Z-BT. This is also a stealthy way to communicate if you are doing any surveillance work.

CONCLUSION

The 3.5mm connection is a good, simple interface for non-mission critical devices. It is about as close to a "standard" as we have in the consumer electronics world. We have created a down lead that allows our headsets to be used with a 3.5mm device. If you need this functionality this is a good solution. Take a look at our website for available offerings and let us know if you have any questions.

GOOD LUCK!

codeRed Tech Support