Amateur Radio

COMMUNICATIONS & TECHNOLOGY

OCTOBER 2018

CQ

Emergency Communications Special

Beyond Untethered...

Pages 18-22

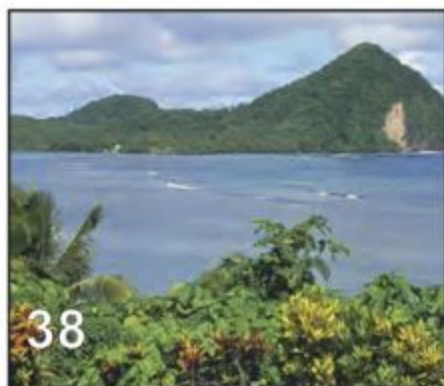# CONTENTS

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Peter Prabucki, VA3ELE, of Mississauga, Ontario, activated more than two dozen Canadian grids — many of them rare — during a 2800-mile roundtrip expedition last summer. He made terrestrial and moonbounce contacts on 144 and 432 MHz and had "a mini pile up off the moon." (Cover photo by Peter Prabucki, VA3ELE)

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FEATURES

EMCOMM SPECIAL: Ham radio is a lot of fun most of the time, however, when disaster strikes and all else fails, ham radio is the only way to get through. This month, CQ reports how hams prepare and answer the call to serve their communities' in its time of need. **See pages: 12, 18, 23, 28, 30, 34, 52, 61, 62, 68, and 70!**

COLUMNS

DEPARTMENTS

WB2REM and K5PA expand on their 2017 article about connecting a wireless headset to your ham gear with a new base unit that adds to your flexibility and — importantly for emergency communicators — can bring back the phone patch for connecting people in disaster areas with relatives outside the affected region.

Beyond Untethered ...

Operating Your Station, Cell Phone, and Remote Simultaneously with a Wireless Headset

BY JIM MILLNER,* WB2REM AND GENE HINKLE,# K5PA

In our article published in the September 2017 issue of *CQ Amateur Radio* entitled "Go Untethered! Operate Your Station with a Wireless Headset," we described the use of the Plantronics CS520 wireless headset with your radio setup. The headset allowed the operator to free themselves from the constraints of a headset cable and to operate their radio wirelessly from anywhere in or around the house. This gave the user an approximately 350-foot range of operation with the ability to mute the microphone when necessary and to transmit via VOX or PTT control.

The 2017 CQ article[1] described how to modify the cabling to work with most current amateur radio equipment. Since publishing "Go Untethered," we have been contacted by a large number of hams who have completed the project and are enjoying the excellent audio capabilities of the Plantronics CS520 headset for amateur radio.

As an update to the article listed above, the authors have located, tested, and are now using an even more impressive wireless headset base unit with the Plantronics CS520 headset (*Photo A*). We have deployed the base unit/cradle of the Plantronics Savi W720 (Plantronics p/n WO2). The WO2 base unit uses the exact same headset as with the CS520 described in our original article. The WO2 base/cradle can be found on the used market, such as eBay, for as little as $30, as well as new on the Plantronics website.

The WO2 base adds increased functionality to the previous CS520 setup. Therefore, anyone who previously completed the CS520 project can now use the same wiring connections to their equipment by just swapping out the Plantronics CS520 base with the WO2 base. For new adopters of this technology, the Plantronics W720 can be purchased from outlets such as eBay or Amazon, and it includes the headset, base, and power supply. Our website provides a lot of source information and model numbers to help you make the appropriate selections based on your needs.

Photo A. The Plantronics Savi W720 wireless headset with WO2 base unit providing multiple connects to a local radio, cell phone, and remote radios. (All illustrations courtesy of the authors)

** <wb2rem@verizon.net>
# <k5pa@arrl.net>

Figure 1. Wireless Headset with connectivity to transceiver, cell phone, and computer (Internet)

In addition to the basic functioning as before, the new base includes Bluetooth and built-in sound card capabilities. In this article, these audio channels will be referred to as transceiver, Bluetooth cell phone, and sound card. Simply tapping buttons on top of the base unit will correspond with connecting the headset to those audio sources. However, only two audio sources can be merged or bridged at a time.

Connectivity

The real power of using the WO2 base unit is the high degree of connectivity in such a small package. The diagram in *Figure 1* lists of all the interfaces that can be made with the base unit, including transceiver audio, Bluetooth audio, and the internal sound card. The base unit itself connects with the headset using 1.9-GHz DECT 6.0 with AES encryption over its wireless link. The wired connections are the transceiver and internal sound card audio, and the Bluetooth connection is available for cell phones.

The base unit is powerful enough to create a conference connection to three additional headsets. This allows each of the other headsets to partake in listening or talking over the wireless connection.

The base unit can also cross-connect any of the three main connections, listed as A-B-C, in the figure. Any two of the three connections can be bridged.

Applications

Transceiver to cell phone (transceiver/Bluetooth) — By cross-connecting the cell phone's Bluetooth to the transceiver, the audio is shared between all users. This allows you to patch in a person from your cellular phone to your radio simply by pushing two of the buttons on top of the base and connecting any two audio sources together. This is similar to the phone patches that were so prevalent prior to the introduction of cell phones. However, during emergency situations, there is still a need to locate loved ones who may only be reachable using ham radio communications. With so many people (including many hams) using cell phones as their only phones, a ham on the receiving end of a call from a disaster area may be unable to connect his/her ham rig to a phone line to allow relatives to speak with each other directly. This setup permits phone-patching to a cell phone.

Transceiver to remote radio connections (transceiver / sound card) — Cross-connecting the transceiver sound to the sound card of the computer, distant radios can be connected together. We use this mode to listen and share the audio of our signals that are received at a remote site. This is excellent for monitoring signal quality from distant locations. In this mode, caution needs to be taken to avoid simulcasting (transmitting at the same time on the same frequency from two locations) which is not allowed by FCC regulation.

Remote radio to cell phone (Bluetooth/sound card) — Cross-connecting the Bluetooth to the sound card in the base unit, the cell phone audio can be joined to a remote radio site anywhere in the world. This is similar to connecting the Bluetooth to your local radio; however, here the radio is remote. Of course, as with any cross-connection, third-party radio regulations must be followed for all concerned.

You can also add a third audio source from your computer and, for example, merge audio from Skype or Instant Messenger into either your telephone or radio.

Operating Headset in Solo Mode (No Cross-Connections)

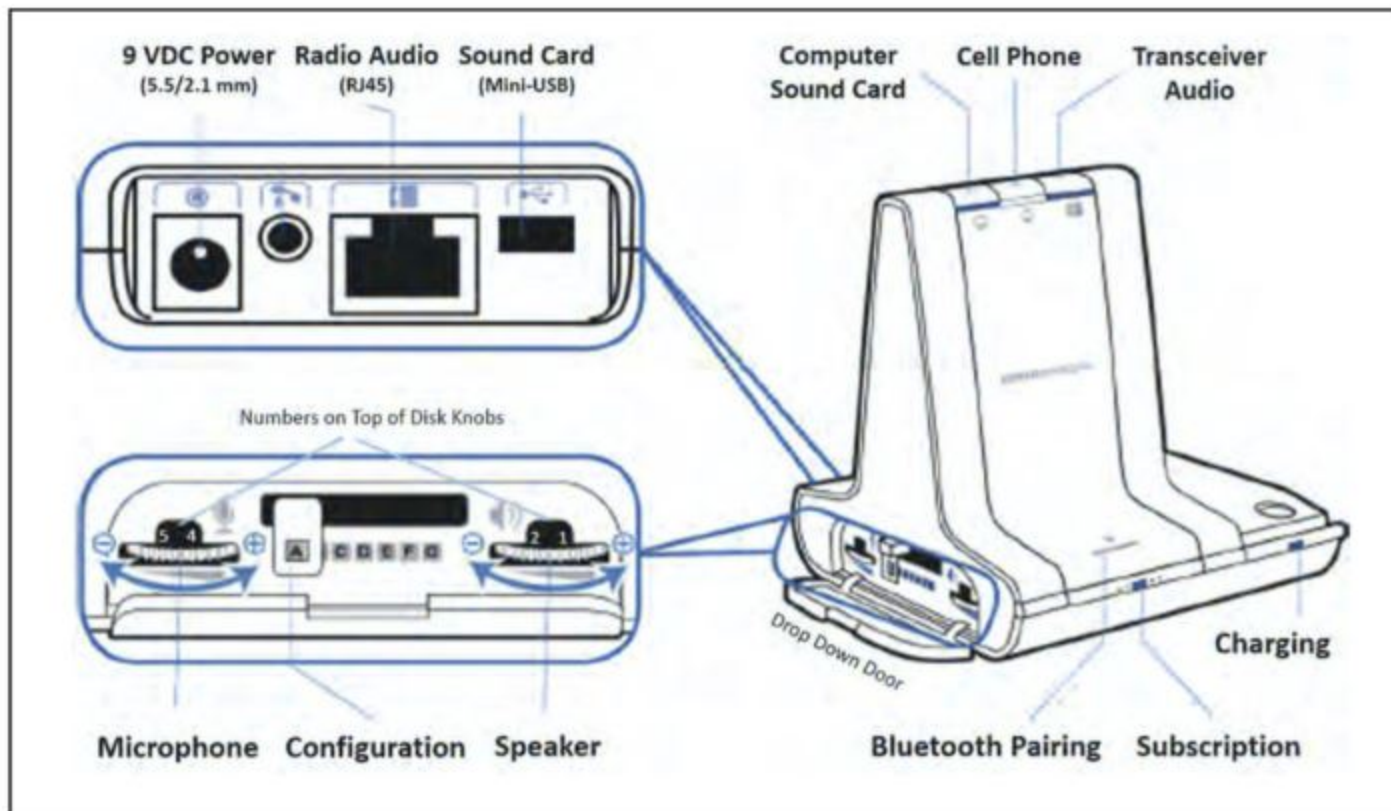The normal solo mode of the headset provides untethered

Figure 2. WO2 Base Unit Showing Connections and Controls

wireless access to your ham radio transceiver, your cell phone in close proximity to the base unit, and with remote radios using your computer's internet connections. This is our normal daily usage, but it is nice to know we can always join other connections at the press of a button on the WO2 base unit using the Plantronics headset.

Connectors, Controls and Indicators

The diagram in *Figure 2* shows the location of each of the connections, controls, and indicators on the base unit. Each point is labeled so it can be referenced in the following discussions.

Connectors
• 9 VDC Power – to power plug from wall power supply
• Radio Audio (RJ45) – to ham radio microphone and speaker connections
• Sound Card (Mini-USB) jack – to computer USB port

Buttons to Press
• Computer Sound Card button – connects internal sound card audio
• Cell Phone button – Bluetooth
• Transceiver Audio button – ham radio transceiver microphone and speaker
• Bluetooth Pairing – button and LED
• Subscription – silver color, thin button with LED in middle
• Charging – LED indicator

Volume Control Knobs (side view, number in white on top of disk)
• Microphone Volume – set to about 4 or 5 as shown on top of disk knob

• Configuration Slider Switch – normally set to A but can be changed to improve reception if needed
• Speaker Volume – set to about 2 as shown on top of disk knob
Note: These controls are accessed by lowering the door located on the left surface of the base unit (refer to the figure).

Connecting to Ham Radio Transceivers

The WO2 base unit needs a custom cable to connect to your ham radio microphone and speakers. The connections require an RJ45 plug from the base unit with wires connecting to your radio's microphone and speaker jacks. Unless you are strictly using VOX for controlling your transmission, a push-to-talk (PTT) connection is also required.

Fortunately, the connections for the CS520 base unit described in our prior *CQ* article are the same ones needed for the WO2 base unit. The interfaces between the two base units are totally interchangeable. Therefore, the "CS520/W720 Interfaces to Ham Radio Catalog" (*Figure 3*) is still available and even expanded to include newer radios such as the ICOM IC-7300, IC-7610, and FLEX radios![2]

Once the WO2 base unit is connected to your radio, you can establish the radio connection simply by pressing the top right button (Transceiver Audio button). You will hear receiver audio in the headset and be able to talk on the radio.

Connecting to Bluetooth Cell Phones

The Bluetooth in the WO2 base unit must first be paired with your cell phone. To begin pairing, press and hold down for four seconds the Bluetooth Pairing pushbutton on the front bottom-left side of the base. The LED will flash red/blue, indicating a pairing operation. It will continue flashing for 10 min-

utes, at which time you will have to press it again if you were unable to pair with your cell phone. While flashing, look at your cell phone Bluetooth connection menu and search for "Savi 7xx" from the list of found devices. If prompted for a passcode, enter four zeroes (0000). Once paired, the red/blue flashing becomes a steady blue.

After the WO2 base is paired with your cell phone, you can make a call and use the headset by simply pressing the middle button at the top (Cell Phone button). You can end the call by pressing the end call button on the headset (center button) or the center button (Cell Phone button) at the top of the base unit. An alternate way to disconnect the Bluetooth, which is not recommended, is to press the actual Bluetooth button (Bluetooth Pairing) on the WO2.

When you press the Bluetooth Pairing button, you will unpair the base unit from your mobile device. This means you will have to pair the two again in order to use your cell phone. By keeping it paired all the time, the cell phone will remain ready for use with the base unit.

One very nice application is to be able to place your cell phone in the best location in your home for receiving cell service (i.e., the highest number of bars) and then being able to talk freely as you roam across your home without worry that the cell coverage might be spotty!

Connecting to Computers

The WO2 base unit can also be connected to your computer using a cable between the Mini-USB connector on the base and a USB port on your computer. Once you have made the cable connection, the WO2 base will appear as a sound card. You will have microphone and speaker volume controls on your computer sound panel that you can adjust.

When you open your software programs that use a sound card, scroll to the list of available sound cards and select the "Savi 7xx" from the list.

Once the sound card is selected on your computer, you can connect the headset to the sound card simply by pressing the Computer Sound Card button at the top, left button of the WO2 base.

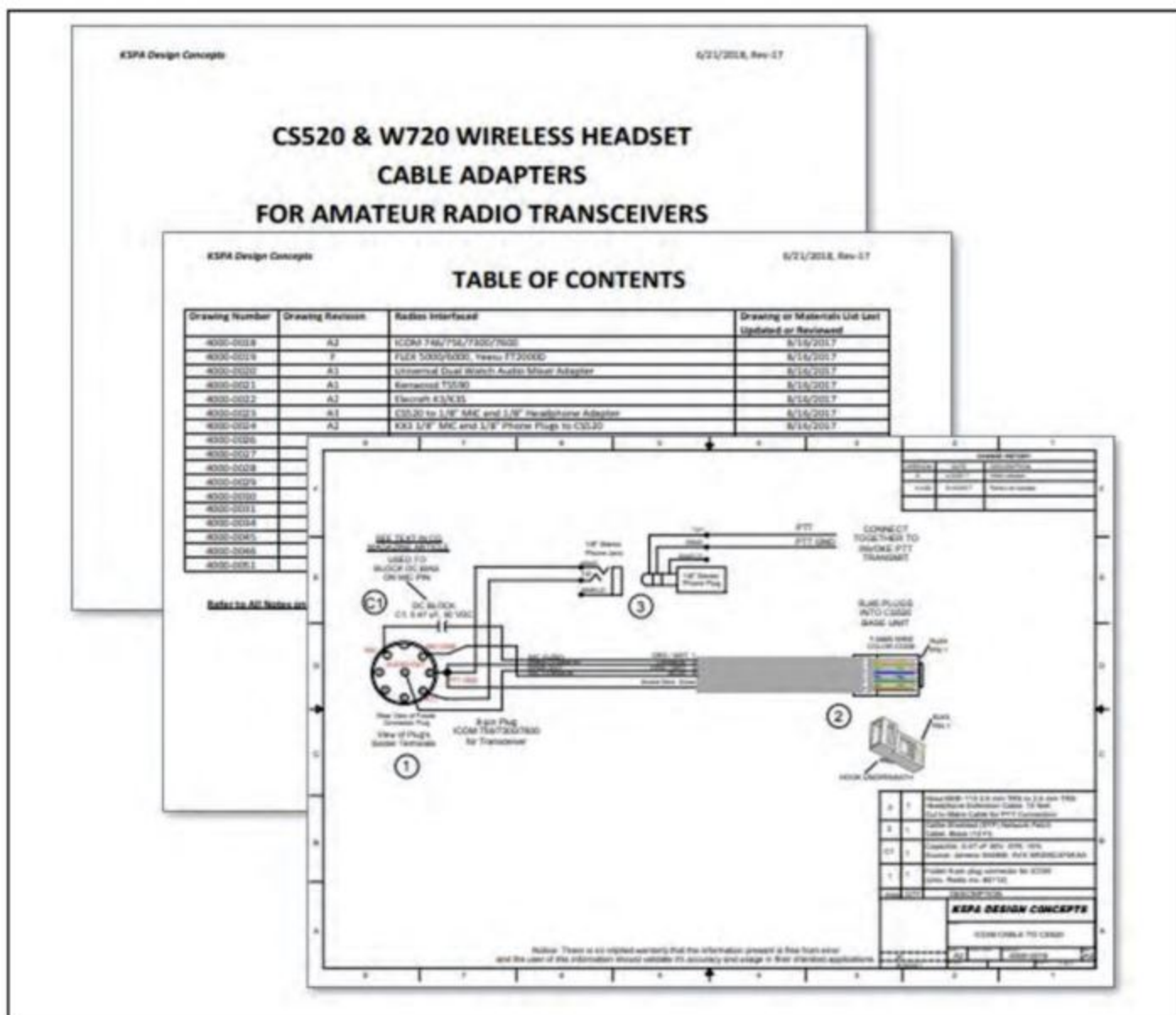One of the great applications for connecting to computers

Figure 3. Wireless headset base unit interface wiring diagrams for selected ham transceivers that are available at the authors' website.

Purchasing Savi W720, WO2 Base Unit from the USA Marketplace

The WO2 base unit must be purchased with the correct headset cup so the headset can be charged when in the cradle. *Photo B* shows how the WO2 should appear when it has the correct cradle already attached.

If you find a WO2 base with a different headset charging cradle, it can be snapped off by pulling up. Now, you can snap the proper one in its place. Preferably, you should buy the WO2 unit with the correct cradle already installed for the binaural (2-ear) headset as shown in the figure.

If you want to replace your existing cradle, the headset cup is Plantronics P/N 83776-11 which, again, can be snapped in place onto the WO2 base. It can be purchased separately from eBay or the Plantronics Outlet Store.

Photo B. The Plantronics WO2 wireless base unit showing the proper charging cup mounted to the right side.

is to have your remote radio software running on your computer and being able to use the wireless headset to talk and listen while roaming around the house.

Connecting Multiple Sources

The truly amazing feature of this wireless headset is the ability to connect any two of the three available sources. Applications include connecting your transceiver to a cell phone to essentially create a phone patch, to connect your cell phone to your computer that is connected to a remote radio application, or to connect a remote radio to your ham radio transceiver using your computer's sound card and internet connection.

To combine the two sources simultaneously, just hold any two of the three buttons until both LEDs turn green.

Connecting Multiple Headsets

A favorite application is to connect other headsets to the same connection already in progress. This is useful when multiple operators are listening or even talking on the radio at the same time during events such as Field Day or contesting.

To conference up to three additional headsets on the same connection already in progress, simply place each headset into the cradle of the WO2 base unit. The base unit's subscription LED flashes from green and yellow to a solid yellow. The primary headset user will hear a beep and can accept the conference request by pressing the call button in the center of his/her headset within 10 seconds. Additional headsets can be conferenced in the same manner.

Any conferenced user can exit the call by simply pressing the headset's call button or by placing the headset in the WO2 cradle to disconnect.

Increasing Your Talk Range

The talking range of the wireless headset with WO2 base unit is a whopping 350 feet! You can adjust the base unit to lower ranges with the benefit of increased talk time. There are three settings of High (up to 350 feet), Medium (up to 150 feet), and Low (up to 50 feet).

With the base and headset not connected to anything, press the Subscription button and the Transceiver Audio button for 3 seconds. The Transceiver Audio button's LED will flash green to indicate High range. If you press both buttons again for 3 seconds, the Transceiver Audio button's LED will flash yellow to indicate Medium range. Press both buttons again for 3 seconds, and the Transceiver Audio button's LED will flash red for Low range. Repeating the dual button presses will cycle through these options again.

Summary

In our 2017 article, "Go Untethered," we introduced a relatively long-range wireless headset giving you flexibility in operating your radio without being attached to a microphone or headset cable. Now, with the simple replacement of the Plantronics CS520 base with the WO2 base, you can expand this capability exponentially.

During emergency situations, with the new WO2 base, you can merge Bluetooth audio from your cell phone (which can also be conferenced to numerous other emergency services) into your radio creating a high-tech, modern-day phone patch.

If that is not enough, the base will merge any two of the three connected audio sources. For example, this could include merging audio from online VOIP software such as Skype, Instant Messenger, or WhatsApp to your phone or radio. Like the original article stated, the wireless headsets with the WO2 base unit continues to broadcast crystal clear audio and will tremendously expand your range of home operation. Don't wait for the next emergency or complain that you have to leave the air to do a chore. Instead, go wireless and expand the horizons of your radio operation and preparation for emergency situations.

Notes:
1. For further information on the September 2017 *CQ* article, go to <www.k5pa.com>. On the website, you'll find a catalog of wiring diagrams for different transceivers (see Note 2) as well as references to user manuals and other pertinent information of interest.
2. The radio interface catalog can be downloaded from <www.k5pa.com/catalog.pdf>.