W2IHY Multi-Switching System: 3 × 4 Switch Plus Controller, iPlus Audio Switch, and iBox Interface

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This review includes many products offered by W2IHY Technologies. It's hard to understand the complete value of these products by reviewing them separately. So, this review consists of a solution using four W2IHY products: the 3 × 4 coax switch plus controller, the iPlus audio switch, the iBox audio interface, and the eight-band audio equalizer that was reviewed in the December 2000 issue of *QST*.

As soon as you have more than one HF radio and want to use it in the same station, you need to be careful if you want to keep the two connected and ready to use; otherwise, you may damage one of the receivers. You can use different radios on different bands/antennas using band-pass filters, or you can set up a switching solution to use them independently. That's what I did, as my radio usage depends on the operating modes, not the band. In June 2019, I posted on my personal YouTube channel a video about how I safely managed multiple HF radios in the same station. To view the video, titled "Safely connect several HF radios with multiple antennas," see **https://youtu.be/9FntelKOjoc?si=sb0PV4krwBRzkp3N**. This setup has served me well over the years, and I've never damaged anything, which is the most important. But it doesn't allow me to enjoy my different HF radios quickly. Yes, it protects my rigs from switching mistakes, but it takes too long to compare my radio performance in a particular situation. Although I can switch the coax, all radios have their own speakers. My PTT connections are going through homemade splitters hanging from the wires behind the desk.

I started looking for a better solution. My plan was to keep my current coax antenna switch that is located outside, but replace my radio switch with something that can also switch the PTT and ALC, and it has to offer the same isolation protection or better than my current setup. In parallel I was looking for a speaker switch. The goal was to make some room on my shelves by removing some extra speakers. I also wanted to be able to use any of my radios with my bhi audio equalizer with DSP noise filtering. If everything can switch together, it will simplify and facilitate the comparison between my radios, as they will be using the same set of speakers. In my online search, I found some interesting products, but I kept coming back to the W2IHY website. My first impression was that it was expensive — until I understood its value. After a lot of reading, I couldn't find any equivalent. At the end, I concluded that the W2IHY coax switch and the iPlus were the best integrated solution for my needs.

Bottom Line

W2IHY Technologies offers one of the most advanced switching solutions for a station using multiple radios with multiple antennas. With its well-thought-out product integration, one-switch knobs allow switching safely between three radios, the microphone, the audio speaker output, the PTT, the amplifier keying, the ALC, and the coax input.

My initial intention was to buy only three out of the four units, but I soon found that if I added the W2IHY eight-band audio equalizer and noise gate, I would be able to use only one microphone that would be switched at the same time as the coax, PTT, ALC, and speakers. This also means that I can use an Icom, Kenwood, or Yaesu microphone that will work on all three HF radios.

The W2IHY 3 × 4 Switch Plus Controller

The 3 × 4 switch plus controller lets you control up to three radios to a single coax output. It's built to last with a rugged steel chassis, and it screams quality. The unit is 16 × 3⅜ × 5 inches. It's also possible to rack it into a 19-inch rack mount (an optional bracket is available for $40). It can handle up to 10,000 W of RF (PEP) and offers isolation between its coax ports greater than –70 dB, according to the manufacturer. My observations confirm that this is accurate and similar to my previous setup (more on this later; not tested by the ARRL Lab).

With this coax switch you can switch and route up to three radios to a single amplifier or one antenna output, plus the amplifier keying (PTT). The ALC and the speaker's output will automatically follow the selected radio.

There's another option that you can buy to switch multiple antennas to multiple radios — the 1 × 4 coax switch. But I wanted to keep my outside remote switch for my HF antennas, so I didn't need it. The 1 × 4 coax switch combined with the 3 × 4 coax switch plus will provide more output connection, allowing for the ability to switch three radios to up to three amplifiers or up to four antennas. If you have more than three radios, you can cascade another 3 × 4 switch if you wish.

The Front Panel

On the front panel, from left to right, you have the **POWER** switch with a yellow LED on top that will be lit when turned on. When the switch is in the off position, coax for all three radios will be put to ground. This is automatic and very convenient. Then you have the **TUNE** switch. When the red LED above is off (switch down), the amplifier PTT will be keyed, but when the switch is up, the LED will be on and your amplifier will not be keyed. Next, you have the **LOCAL / REMOTE INPUT SELECT** switch for the **RF INPUT** (the radios). You have four positions that you can switch using this rotary knob: radio **A**, **B**, **C**, and **REMOTE**. Obviously, this lets you switch between three radios —**A**, **B**, and **C** — and the **REMOTE** position is used when the switching is controlled by another box, like the iPlus (more on this later). For each radio you have a rotary knob with three positions for the **RF OUTPUT**, **1**, **2**, and **3**. If you have only one output connected on the coax switch and no 1 × 4 remote switch (like me), then all three radios' **RF OUTPUT** will be the same even if they are set to different positions (**1**, **2**, or **3**). If you have the 1 × 4 remote switch, you can set different output for each of the three radios. The final switch on the front panel is the **AUX** switch, which is to be used when the coax input of the optional 1 × 4 switch is connected to the auxiliary coax output of the 3 × 4 switch. In my case, this one is off.

The Rear Panel

On the rear panel (see Figure 5), from left to right, on top you have five DIN types of connectors. The first two have six pins and are for power — **POWER IN** and **POWER OUT** — if you need to power a second switch. The power requirements are 10 to 15 V dc at 1 A for powering one 3 × 4 controller and one 1 × 4 antenna switch. You will need 2 A if you want to power two of each. The power cable is included but you will need to connect it to your station's power supply. Keep in mind that the cable has no fuses but there is a fuse inside the unit. I used a dc power distribution outlet that is already fused.

The three other DIN connectors use five pins. The first one, **INPUT SEL**, is used when the **LOCAL / REMOTE** input select switch is in the **REMOTE** position. It allows the selection of the **A**, **B**, and **C** coax inputs (the three radios) to be selected remotely. The **OUTPUT SEL** is used to identify which of the three coax outputs (1, 2, or 3) on the optional 1 × 4 switch is active. This DIN connector can also be used to connect to the input select (**INPUT SEL**) of a second 3 × 4 switch when adding more radios, and an additional level of switching is required. The **OUT TO 1 × 4 SEL** connection switches the coax input of the 1 × 4 switch to one of the four coax outputs. If you want to switch the coax input with the iPlus audio switch, only the RCA connectors need to be connected, and you will

Figure 5 — The W2IHY 3 × 4 Switch Plus controller rear panel.

be able to switch remotely if the coax switch is in the **REMOTE** position.

Below the DIN connectors you have an obvious **GND** connection and four SO-239 connectors. The first two are for radios **A** and **B** (**RF INPUTS**). Then you have the RF **OUTPUT 3 × 1**, where you connect your amplifier or your antenna depending on your setup. The next one is for the third radio input (**RF INPUTS C**).

From the middle to the right of the rear panel, you have multiple RCA connectors, along with all the input and output for radios **A**, **B**, and **C** for the PTT, ALC, and speakers. Other than the input and output mentioned previously, you have three RCA connectors for remote switching, **INPUT SELECT** (where I connected the iPlus audio switch). You also have two RCA connectors for **SWR IN** and **SWR OUT**, which prevent keying the amplifier in case of high SWR or for other reasons. They may be connected to an SWR meter, an antenna tuner, or a SteppIR controller that has circuitry to disable amplifier keying when required. If you want to enable the PTT feature at all times and have nothing to connect to the **SWR IN** and **SWR OUT**, you will need to connect them; otherwise, the PTT won't work.

For more information about the 3 × 4 switch plus controller, you can download the manual online at **https://w2ihy.com/wp-content/uploads/2020/06/3x4SwitchManual.pdf**.

The W2IHY iPlus Audio Switch

The iPlus audio switch can be used to switch between three radios, the audio speaker output, the audio mic input, and the PTT. It must sound similar to the coax switch, but it can use one or two audio inputs to any of the three connected radios, plus it's meant to work in combination with the coax switch, as it can remotely control the radio selection. This means that if you have both units, you have only one switch that will switch everything to any of the three radios. I needed the iPlus audio switch to have two audio inputs and three audio outputs to the radios (the mic inputs). The first audio input is for the microphone (in my case it's the eight-band EQ), and the other is used to connect the iBox interface that is used for the LP-700 two-tone audio output. This allows me to inject a two-tone audio signal to the selected radio, a very convenient option.

The Front Panel

On the iPlus front panel, the first rotary knob on the left is the main switch for the three radios. If you connect the iPlus to the **INPUT SELECT** RCAs on the 3 × 4 switch plus controller, the iPlus will remotely switch the coax as well if the controller is in the **REMOTE** position. Next, there is a flip switch named **INVERT PHASE ON**, which reverses the phase of the audio output 180 degrees for proper AM modulation asymmetry. The other three knobs are for the **OUTPUT LEVEL**. These allow you to adjust the audio level output to the radio's microphone input independently.

The Rear Panel

On the rear panel (see Figure 6), from left to right, you will find the first two audio inputs (there are a total of three). The **AUX INPUT** uses a five-pin DIN connector, and the other uses an XLR named **AUDIO INPUT**. Next, on the right you have three other five-pin DIN audio outputs, named **AUDIO OUT**. I use these to connect up to three radio microphone inputs. On the right side of the rear panel, you have several RCA connectors to connect the speaker output and the PTT of all three radios to one output. In my case, the iPlus is used only for audio input, and all the PTT, speakers, and ALC connections are made into the 3 × 4 controller.

The iPlus is passive equipment, and no external power is required. The unit dimensions are 9 × 3 × 5.5 inches. There is no ground connector, but I used a screw on the chassis to ground the iPlus to the station common ground.

For more information about the iPlus audio switch, download the manual online at **https://w2ihy.com/wp-content/uploads/2020/06/iPlus_manual_8_21_12.pdf**.

The W2IHY iBox Audio Interface

The iBox is a variable attenuator and an interface box. Its dimensions are 4 × 1¾ × 1¾ inches. It's small (see the lead photo), and it doesn't require any power. You can buy it in a kit or as a fully assembled unit. This unit is simple but very useful, as it can serve many purposes, like interfacing an external audio device to your radio equipment, matching impedance, isolating your audio from hum caused by ground loops, providing RFI isolation, and interfacing with balanced and unbalanced audio gear. On top of the

Figure 6 — The W2IHY iPlus audio switch rear panel.

unit, you have a variable attenuator to adjust the output audio level. On one side is an audio input of 600 Ω using a ¼-inch stereo jack, named **AUDIO IN**. According to the manual, this input can accept a balanced source and run the iBox as a balanced input. It can convert a balanced source to an unbalanced input to the iBox, or accept an unbalanced source and run the iBox input unbalanced. On the other side you have the five-pin DIN **AUDIO OUT**. The DIN plug wiring can be modified to obtain a low-Z balanced output, a hi-Z balanced output, or a low-Z unbalanced output. The only other connector is an RCA type for the **PTT**. The **PTT** input jack offers an access point for your switch.

There are many reasons that you would need an iBox, but in my case it was to connect the audio output of my Telepost LP-700 to the iPlus in order to be able to send a two-tone signal to any of my HF radio mic inputs. What's funny is that on page 10 of my LP-700 user guide, Telepost suggests using the W2IHY iBox to interface the two-tone output to the radio.

For more information about the iBox, download the manual online at **https://w2ihy.com/wp-content/uploads/2020/06/iBox_Operating_Manual_8_21_12.pdf**.

Planning and Making the Connections

Shortly after you place an order for a 3 × 4 controller on the W2IHY website, you will receive an email from the owner, Julius Jones, W2IHY, who will want to talk to you in order to understand your specific setup. After your conversation with him, he will provide custom pictorials specific to your configuration, showing in detail how the switch should be connected. Considering the level of service he provides, it's better to know in advance; if there are any issues, he knows your setup and can easily help you remotely if needed.

I decided to buy from W2IHY all the necessary cables to connect my radios and equipment. I could have bought all the connectors and cables and soldered them myself, but I would still have to buy the cables, connectors, etc., and I would have to do the soldering of many small pins, which is always a struggle for me. So, I bought the 3 × 4 switch cable package ($60) and three pre-made 8-foot mic cables for my three radios ($41 each). I also got the W2IHY to iPlus 4-foot cable ($35) and some 3.5-millimeter TRS cables (another $35).

Julius had carefully prepared the diagram and all the cables to connect my equipment. Figure 7 is just one example, as there were many in the custom manual. Every diagram comes with a text description, and there's one for each type of connection, like the speakers, microphone inputs, ALC and PTT amplifier connections, etc. — this includes all your gear you need to connect. Julius sent the custom diagrams to me prior to shipping the equipment to ensure we were both confident it would be correct for my setup.

The package arrived well packed and well identified, with plug-and-play instructions. First, I unboxed the W2IHY equipment and noticed that all the cables were packed in bags grouped by the type of connection with all the necessary identification. Then I connected all the cables to the W2IHY equipment on a table in the garage (see Figure 8). I used hook-and-loop straps (not included) to tie the cables in order to move everything in the shack, and did the other end of the connections on my equipment, and it worked on the first try. I know there are a lot of cables involved, but it was worse before I added the W2IHY equipment. If you order all the cables from W2IHY, it's very easy to set up. The good news is that you won't have to do it again; now everything will switch without manipulating any cable.

On-the-Air Operation

Since I added the W2IHY equipment to my station, the way I operate my HF radios has changed com-

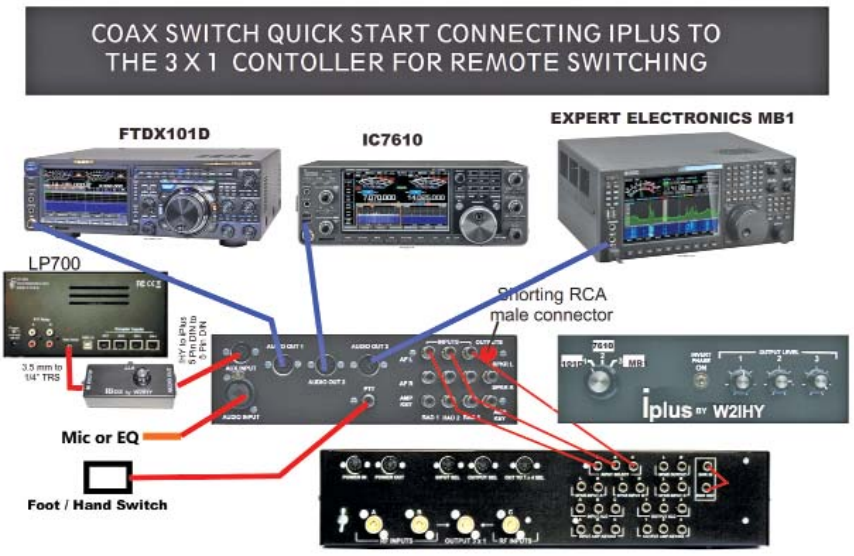

Figure 7 — The customized diagram prepared by W2IHY for my particular setup.

Figure 8 — The complete pre-wiring of all four pieces of W2IHY equipment.

pletely. Sometimes I even switch radios in between a transmission while in a QSO, and the receiving station can't even tell. It's such a pleasure to be able to enjoy my radios with a flip of a single switch. Now I do it all the time, just for fun.

I have only one microphone on the desk and only one set of speakers connected to the bhi audio equalization amplifier with DSP noise filtering that switches along with the other radio connections. At any moment I can send a two-tone audio signal to the active radio without touching any cables or going into any menus to change the mic input. All followed the only switch I used, the one on the iPlus. I can switch quickly and safely between radios and compare them in different situations.

When I switched radios before, I put the unused transceivers on another band (usually 6 meters), as far as possible from the transmitting frequency. While doing the tests with the Expert Electronics MB1 after installing the W2IHY equipment, I forgot to put the Icom IC-7610 to 6 meters, so both radios were set at the same frequency. I was running 1 kW on 80 meters and didn't hear any feedback while transmitting as the speaker was on the active radio, but when I looked at the Icom IC-7610, the received signal was only +20 over S-9, so the coax switch was doing a great isolation job. This is good to know, and with the coax switch, the speakers switch automatically. It's like putting the other transceiver on mute. Switching radios has never been easier, and I'm confident that it's safe.

Conclusion

The W2IHY Multi-Switching System is a great addition to my setup. I'm very pleased with the result and the simplicity of operations that it provides.

I already knew that the W2IHY service was incredible, not only because of the reputation of the company but also from a past personal experience. In 2003, I bought a used W2IHY eight-band equalizer on eBay, and when it arrived it didn't work. I contacted Julius, W2IHY, and he tried to solve the issue over the phone. Ultimately, however, he asked me to ship the unit to him. When the unit was returned, it was repaired for free as the unit was still under warranty, so I only had to pay the shipping. This tells a lot about the manufacturer backing its products. Even if I didn't buy the unit from him, he still provided the support service. Plus, if you're not totally satisfied, he offers a 30-day, no-questions-asked, money-back guarantee.

If you have many radios and want to use them safely without disconnecting any cables, W2IHY can help you set up a safe and efficient multi-switching system to suit your operating needs.

Manufacturer: W2IHY Technologies Inc., 19 Vanessa Ln., Staatsburg, NY 12580, **www.w2ihy.com**. Price: 3 × 4 Switch Plus Controller, $549.99; iPlus, $239.99; iBox, $79.99; Eight-Band Audio Equalizer, $299.99. Shipping and cabling not included.