BY R. SCOTT ROUGHT,* KA8SMA

QRP Special

The Chinese Pixie Craze ... Great Fun For a Few Dollars!

Nine dollars and 21 cents...my total cost for a Chinese Pixie, a low power CW transceiver kit I purchased online. No misprint...for less than $10 I purchased a single-band QRP transceiver kit equipped with a crystal for the 40-meter band and had it delivered right to my doorstep within a few days. These inexpensive kits are manufactured in China and are based on the well-documented and popular Pixie design that has been written about in books and magazines for several years. Over the last couple of years, I have heard a lot of jabbering about these kits...some good, some bad, but what I *do* know is that a lot of hams have purchased these kits. Not to be left out, I purchased the "Qianson HAM Radio 40M CW Shortwave Transmitter Receiver Version 4," just one of the many Chinese Pixie kits available online, then built and tested it to answer the question: "Do these kits really work?"

* <ka8sma@cq-amateur-radio.com>

The Purchase

I try to stay abreast of QRP equipment for sale online and, in late 2016, I took an interest in the Pixie kits being advertised. These kits are regularly listed for sale on eBay, Amazon, and other online stores at such low prices it begs the question, "is it too good to be true?" Having built several more expensive QRP kits in the past, I was dumbfounded that I could purchase a QRP CW transceiver and have it shipped directly to my QTH for the price of a burger and fries...and if I upgrade my order to include a milkshake, I could order the kit already built and mounted inside an enclosure. After several months of deliberation, I ordered the kit from Amazon. After all, how could I lose? If the kit did not work, I had a handful of parts for the junk box.

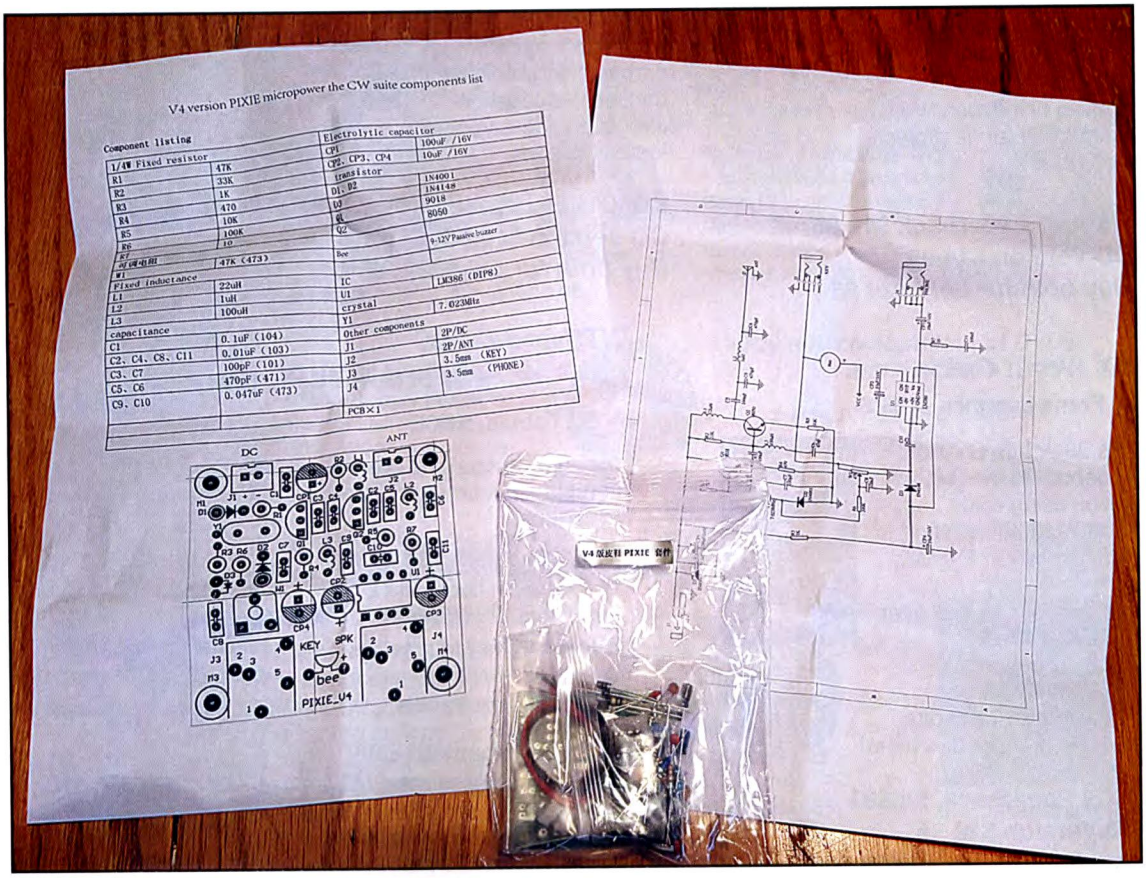

Photo A. The Qianson Pixie Kit...bag of parts, schematic, and parts layout diagram.

When I placed my Amazon order, I was pleasantly surprised to see the Chinese Pixie qualified for expedited two-day shipping at no extra charge under Amazon Prime membership (my XYL sees to it that all of her Amazon orders arrive as quickly as possible!). I ordered the kit Monday morning and it arrived Wednesday afternoon.

I opened the shipping envelope not sure what to expect inside. Enclosed was a clear sealed bag containing a PC board, a handful of parts and two pieces of paper (*Photo A*). One sheet of paper was the transceiver's schematic and the second sheet contained a table listing the components and their associated values along with a parts layout diagram for the PC board. No other information or written instructions were provided.

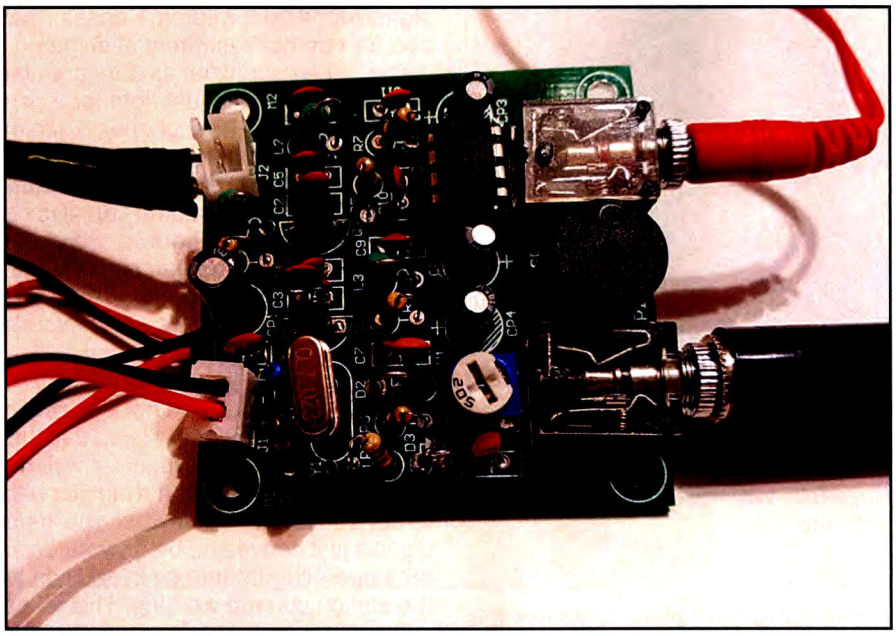

Photo B. Close-up of the Pixie PC board after assembly.

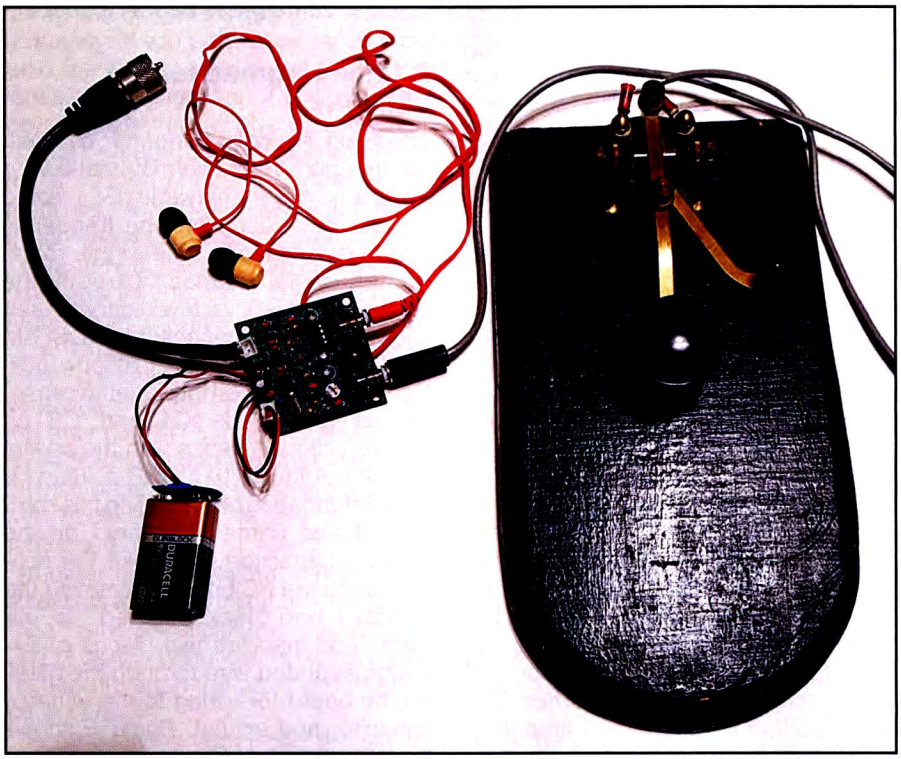

Photo C. The completed Pixie…ready for the "smoke test."

Heating Up the Iron

As with any kit, the first step is to sort and catalog the parts. I use scrap pieces of foam insulation and masking tape for this purpose. I push each part into the foam, determine its part number, and then write the number on a piece of masking tape that I affix to the foam next to the part. Another method is to tape each part to a piece of paper then write the corresponding part number next to it. I have found it is always best to sort and label all parts as the first step in building a kit. It is much easier to switch parts around *before* they are soldered in place.

The most time-consuming element in building this kit was determining resistor and inductor values. The parts table only indicates the value of each resistor and inductor. For example, "R1" is 47K, "R2" is 33K, etc. Some kits include a cheat sheet listing the order of each color band (i.e. yellow, violet, black) to denote the value of resistors and inductors…you will not find that here. You need to determine the value of each component. If you are like me and cannot remember the numeric value associated with each color band, visit an online resistor/inductor color code calculator for a refresher. Be sure to look closely, and double-check the color bands on resistors and inductors when determining their values. I have difficulty in differentiating between red and orange color bands and find it helps to sort these types of parts on a white sheet of paper. The remaining parts (diodes, transistors, capacitors, etc.) are less difficult to sort as their values generally are printed directly on each component.

After sorting the parts, I stuffed the PC board (approximately 2.5 inches by 2.5 inches in size) with the resistors and inductors and soldered them in place. I then installed the diodes and capacitors and, after soldering, installed the transistors, integrated circuit (LM386 audio amp), and a buzzer which acts as a sidetone when sending CW. I "tack-soldered" the crystal to the PC board. I did this by inserting the crystal through the holes, heavily tinning the crystal's lead wires with solder, and holding the wires to the pads on the bottom of the PC board while briefly applying some heat from the soldering iron. This was done so I could easily remove the crystal from the board for a modification (described later). Removing components from a board after inserting them through the holes and completely soldering in place

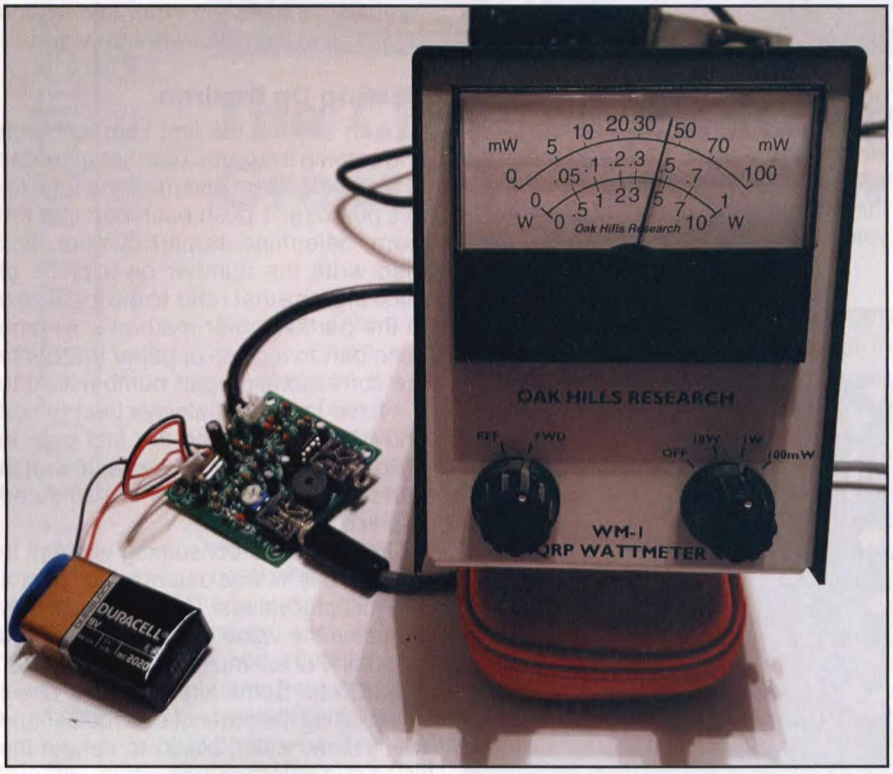

Photo D. Pixie's output on my Oak Hills Research Wattmeter...nearly one-half watt with 9-volts input.

can be a real challenge. Tack-soldering is my work-around when I know I may later remove a part.

The kit came equipped with 3.5-millimeter phone jacks for a key and headphones. Soldering these components to the PC board along with pins for DC voltage (9-12 volts DC, per the schematic) and the antenna were the final steps in completing assembly. *Photo B* shows a closeup of the assembled board and *Photo C* shows the board with all the plug-ins (key, earbuds, and 9-volt battery). Note in both photos that there is a piece of coaxial cable (RG-58/U) exiting the underside of the board. I soldered a short piece of coax (finished with a PL-259 connector on its other end) to the pads on the bottom of the board (beneath the antenna pin assembly) for connecting to a wattmeter, antenna tuner, etc. I could have removed the pin assembly and soldered the coaxial cable directly to the board, but I left the pin assembly in place so I would have other options available if I wanted to do something different in the future.

The Smoke Test

According to the schematic, input voltage can range from 9 to 12 volts DC. I decided to power the unit via a 9-volt battery since I am planning to use this rig in the field and need to minimize weight and size as much as possible. I had a 9-volt battery connector in my junk box and wired it directly to the transceiver's voltage input leads. Prior to attaching the battery, I connected the transceiver to a QRP wattmeter that was fed into a 50-ohm dummy load. I also fired-up my Kenwood TS-530S and tuned it to the Pixie's crystal frequency so I could hear the tone of the oscillator as soon as I connected the battery. The Pixie's crystal oscillator is always powered up whether you are receiving or transmitting; therefore, the oscillator can be heard (tone) on a nearby receiver when power is supplied to the unit. When the transmitter is keyed, the audio is muted and the transmitter's power is amplified and fed into the antenna.

A big smile hit my face as soon as I snapped the cap on the 9-volt battery and heard the whine of the oscillator in my TS-530S. I keyed the transmitter, checked the wattmeter and saw the Pixie was putting out nearly one-half watt (*Photo D*). No smoke, no odor, and no hot components...happy times. The Pixie worked the first time I fired it up and I did not need to crack open a bottle of aspirin.

After the dummy load test, I connected the Pixie to my MFJ 971 portable antenna tuner and plugged in my horizontal sky loop antenna for the real test. The passive buzzer that acts as a sidetone when sending CW emits a pitch that is pleasant on the ear. A piece of masking tape over the top of the buzzer will help attenuate it if it's too loud. After sending a series of CQs I was heard by a "0" lander. I received a 559 signal report from western Kansas...not bad for one-half watt from Michigan.

The audio amplifier is the popular LM386, which I find just right for a pair earbuds or small headphones. I prefer earbuds as they are small, lightweight and can be easily rolled-up for portable operation. A small speaker can also be used; however, without a separate audio amplifier a speaker may be difficult to use unless you are operating from a quiet environment. The first time you are operating portable and hear a nearby bird chirp, you will likely wish you were using earbuds and not a speaker.

It is important to bear in mind that this is a direct conversion receiver with no audio filtering. If you are not familiar with direct conversion receivers, you hear signals just above and below your crystal's operating frequency in addition to the station you are working. This takes a little getting used to, especially if listening to the receiver in a loud environment. The Qianson Pixie has a trim pot that helps fine-tune the receiver and reduces some of the nearby signals.

A Little Upgrade for the Little Pixie

The Pixie is a solid performer by itself, but an upgrade or two may make your Pixie a bit more enjoyable. So I would not be rock-bound on one frequency and to give myself a little wiggle room, I added a variable capacitor to swing the crystal's frequency a few kilohertz. I salvaged a variable capacitor from an AM clock radio I purchased at our local Goodwill and placed the variable capacitor (using terminals "C1" and "C2" on the capacitor) in series with the crystal (See the August 2017 QRP column for more information on salvaging this component and contact numbers on the variable capacitor). To make the connection to the PC board, I removed the crystal I had "tack-soldered" to the board and installed two pieces of 24-gauge stranded wire through the holes on the board for wiring to the variable capacitor and crystal. *Photo E* shows the wiring layout. The variable capacitor allows me to swing the crystal's fre-

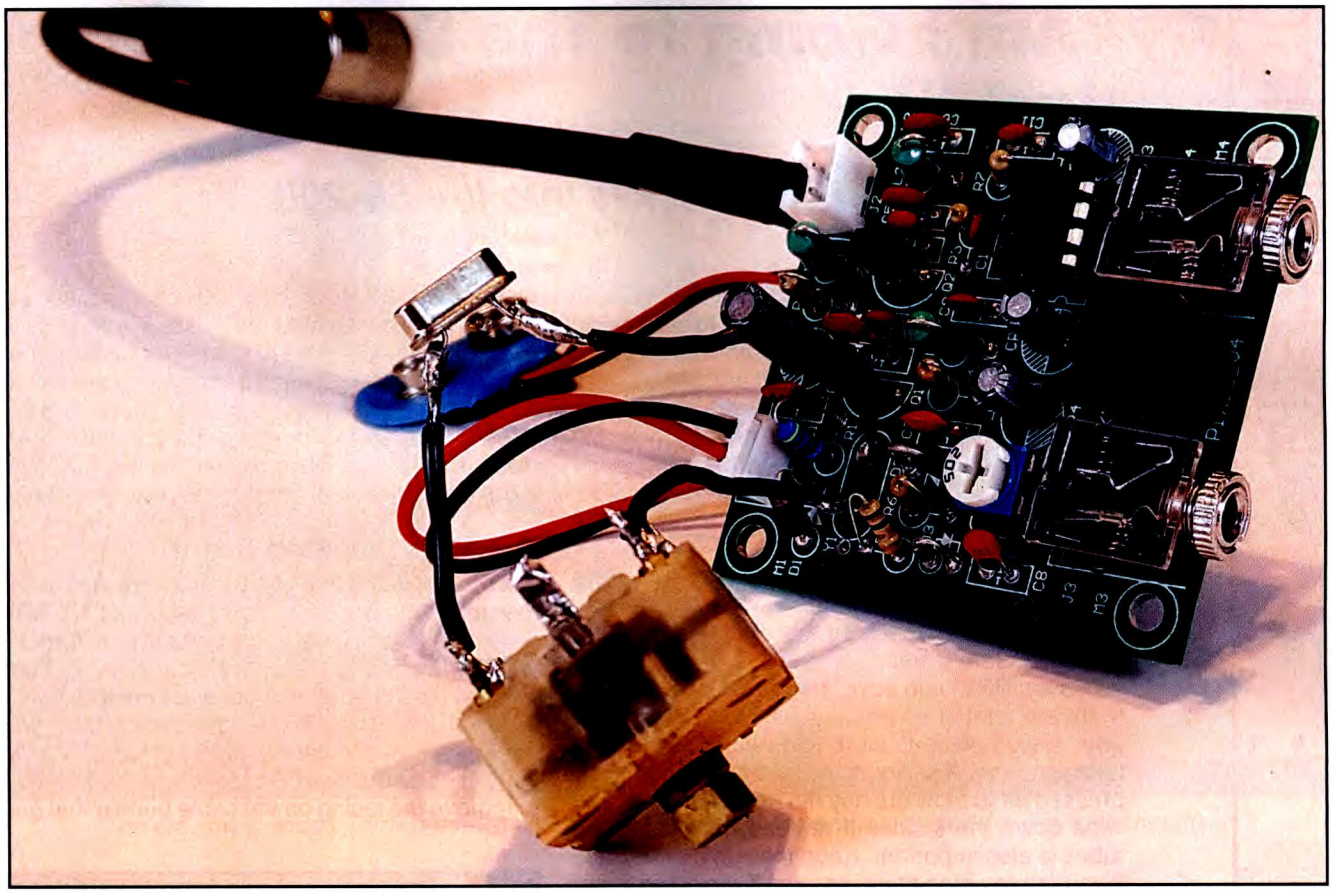

Photo E. Addition of the variable capacitor for some extra swing room.

quency about three kilohertz so I can snag a nearby station calling CQ or move away from a loud station on or near my frequency. If you salvage a variable capacitor from an older radio, be sure to snatch the tuning knob (connected to the variable capacitor) and 9-volt battery connector (if present), too…these items can also be used in dressing up your Pixie.

Other upgrade ideas include adding an On-Off SPDT switch and a second crystal to toggle between two different frequencies. A variable capacitor could be placed in this arrangement to add some swing room on each frequency. It is important to note that the crystal supplied with my Qianson Pixie was for the Extra Class portion of the 40-meter CW band. Other crystals can be purchased (online or at hamfests) to replace the supplied crystal. I experimented with several FT-243 type crystals I had in my junk box and found they work well with the Pixie. Not all crystals are the same size and may not "fit" into the PC board. I overcame this obstacle by soldering short jumper wires to the board and soldering their ends directly to the prongs to one of my FT-243 crystals. Sockets for a variety of crystal types can also be purchased online.

Another upgrade I plan to make is the addition of an On-Off switch to the 9-volt battery lead. Since I plan to mount the Pixie inside an enclosure (including the 9-volt battery), the On-Off switch will allow me to easily turn off the unit without the need to open the case and disconnect the battery when not in use.

As for finishing your Pixie, the sky is the limit. Be creative and do what works best for you. I may use an Altoids® tin since they are thin, have a good clasp and there is room to store an extra 9-volt battery (always good to have backup power), but I am also considering incorporating the Pixie into the "All-in-One Portable Antenna Tuner" (an L-network tuner in a tennis ball container with an end fed wire) that was discussed in the August 2017 column. I am intrigued by the idea of mounting a transceiver, antenna tuner, and antenna all into one package. If I give this a try I will snap a photo for a future column.

Its low cost makes it affordable for anyone who wants to experience the joy of kit building and making a contact with a rig they built themselves.

Final Thoughts

The Qianson Pixie is a bare bones QRP transceiver that is fun to build and use on the air. Its low cost makes it affordable for anyone who wants to experience the joy of kit building and making a contact with a rig they built themselves. The lack of instructions can be frustrating; however, with a little patience even the ham with limited or no kit building experience can successfully tackle this kit. For less than the cost of a movie ticket, you will be entertained for several hours and likely have more fun than a night out in a crowded theater (although your XYL might disagree!)

Finally, if you have any ideas, topics to be covered, or an interesting QRP story to share, let me know and I will work it into an upcoming column. *– Until April, 73*