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Baofeng UV-5R Reviewed

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You may use that calendar to enter amateur radio events of interest to local amateurs which are intended for publication, subject to review and approval.

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All in the Family

by Joe Shupienis W3BC

LAST MONTH WE looked at a tiny wonder from China called the Baofeng UV-3R. It enjoys a well-deserved reputation of providing a lot of bang for the buck, and indeed, it is a remarkable little radio. They're literally selling like hotcakes and more as more hams find a use for a bargain-priced dual-band HT.

After seeing how delightfully well the little guy performs, I had to see if big brother lives up to its promise. So I ordered a Baofeng UV-5R. At a street price of just $60, it seems almost impossible that for a few dollars more it could be significantly better than the $46 kid brother, but as we will see, you pay your money and you take your chances. In this case, you can go ahead and feel lucky!

I ordered mine from "nicheone" on Ebay, and it arrived in three days from China! The expedited shipping was free at that! It comes in a larger, heavier box than the UV-3R, so if nothing else, you know you're getting more "stuff" in this deal. Inside that box are two trays holding all the pieces, stacked one above the other. Included is a readable manual I pretty passable English.

The most noticeable item in the box is the docking charger stand. Along with its matching "wall-wart" power supply, the charger is a true drop-in unit, and charges one battery pack, separately or attached to the radio. It even provides entertainment value when you attempt to read the "Engrish" label on the bottom! (May you never suffer the perils of the dreaded "chareto mistake!")

The Good

THE BATTERY pack is a 7.4-volt, 1800mAH, custom unit designed to fit the UV-5R like a glove. It slides onto the back of the radio, and secures with a solid click ensuring it stays put. I've run the radio for over a day at a time on a single charge without running low, and the unit charges in about an hour or less.

There are many notable differences between the UV-5R and its kid brother. The UV-5R's single knob is an old-school, volume control with a ganged power switch! That's right, turn the knob to turn the radio on and set the volume, just like a 1950s TV set!

The antenna connector is not the "standard" SMA connector. For some inscrutable reason, Baofeng chose to use the bass-ackwards, Wouxun-style SMA connector. Adapters are cheaply available—there's even one at Radio Shack for $6—but why they did this is a mystery to me! At least the supplied dual-band rubber duck antenna is a good one.

Moving from the top of the radio to the front, we start to see where the UV-5R leaves its baby brother in the dust. The display is noticeably different, The dot-matrix LCD is backlit by your choice of orange, blue or violet LEDs. It's also an alpha-numeric display, and allows you to enter channel names in letters and numbers—up to six characters each—but only through the programming software.

The speaker and mic grille is immediately below the display, and the audio sounds very crisp and clean, if a bit on the loud side. The laser-etched metal nameplates add a professional touch. In hand, the whole radio feels solid and professional, unlike the somewhat "flexy" plastic feel of the UV-3R.

The most outstanding feature is the numeric keypad, which is very elegantly backlit with white LEDs to just the right brightness. The keypad is used to directly enter frequencies or channel numbers, or to use "Touchtone™" signaling when transmitting. Additionally, the most common menu items can be selected by pressing the buttons as marked in blue. The overall impression of the radio is one of quality, which makes its tiny $60 price tag almost unbelievable.

If the proof is in the putting, this unit delivers. I measured 5.2 watts on VHF and 4.4 on UHF into a 50Ω load. Low power was inconsistent—one time it was 2.2 watts, another 0.7, and

Solid build quality, well placed controls and low price make the UV-5R worthy of consideration

something in between another time. This may have been due to me enabling the automatic power control feature. More research is indicated

On the air, all reports are that the rig has good audio, as long as I hold it up to my mouth. The tiny mic opening does not do very well at a distance. This may be a design feature to permit “noise canceling” in industrial environments. At full volume, its tiny speaker is more than capable of getting you kicked out of a boiler factory for making too much noise.

Receiver sensitivity is quite good. Like it's UV-3R sidekick, it's rated at 0.2µV/12 dB SINAD. The UV-5R's DSP circuitry really delivers the goods and pulls out the weakest of weak signals with Q5 readability. Spurious responses appear to be under control, and the direct conversion SDR design means no “image” problems and makes intermod a thing of the past. Front end overload is still possible, but the DSP derived AGC seems to do an adequate job.

There are 128 programmable channels, and each one retains individual data fields for receive frequency, transmit frequency, tone encode/decode, wide/narrow deviation, high/low power, PTT ID, Busy-channel lockout, scanning lockout, call-group ID, and alphanumeric channel name. This gives the radio a lot of flexibility, rivaling units at 4 or 5 times the price.

The Bad

MANAGING ALL THAT data is handled by the worst piece of software I have ever seen—and when I first used computers they needed punched cards, so I've see a lot!. I'm being way too kind when I say that the BF5R.exe program is just barely enough to get the job done. It looks like POC software—as in ”Proof of Concept” (you know what I really mean!) Fortunately, once you program the radio, you don't have to suffer through using the software ever again. With universal dislike of the software being voiced all over the Internet, it's only a matter of time until the manufacturer comes up with a finished product, or the Open Source “CHIRP” project gains the ability to manage the UV-5R.

The UV-5R features a Kenwood-style speaker-mic connector on the right side, which doubles as the programming port. This is completely different from the UV-3R's single jack which uses the less-common TRRS, “Three Circuit” 1/8” connector for its speaker-mic and programming port.

The Ugly

WITH APOLOGIES to Clint Eastwood, a ham's got to know his limitations, and this radio certainly has some. Fortunately, none of them are show stoppers, and when you see this radio on your doorstep, it will definitely make your day! Nothing is perfect, though, and here are my main beefs with it:

#1: As already covered, the biggest issue for me is the **crummy programming software.** This is something the manufacturer can easily fix, but it remains to be seen if they do. CHIRP now has support, so things are looking up!

#2: Coming in at number two on my list is the **“bass-ackwards™” antenna connector.**

#3: Manual programming is a bit “odd” requiring **separate steps to program transmit and receive frequencies for repeaters.** The radio does not have convenience features like automatic repeater split built in. (To be fair, I have yet to see ANY rig with automatic repeater split that works 100% with the Western PA Repeater Council's Bandplan!)

#4: A further complaint is that even the **lowest volume setting is too loud.** Sixty years ago, the old '50s TV sets completely muted when turned all the way down, but retro-style volume knob notwithstanding, the UV-5R is almost always “too loud.”

#5: Finally, after the rig warms up from extended transmitting, the LCD display becomes harder to read due to **heat-related loss of contrast.** There is no contrast setting, so you have to wait for the unit to cool a little to regain contrast in the display.

The Bottom Line

AS I STATED, none of these are serious limitations, and most of the time, they won't get in your way. The excellent RF performance provided by this Software Defined Radio's Digital Signal Processing, it's solid build quality, well placed controls and it's low price make the Baofeng UV-5R a handheld transceiver worthy of consideration. At half the price of it's nearest competitors (the Wouxun dual band radios) its price/performance ratio leads the pack.

Like its kid brother the UV-3R the mid-size UV-5R is a significant entry in the full-feature handheld market. Big Brother continues the family tradition of providing plenty of bang for the buck. Whether you're looking for an extra HT to keep in the car, or you figure it's about time you got on the UHF repeaters, this radio deserves a place on the short list of every ham who is looking for a good HT at a reasonable price.

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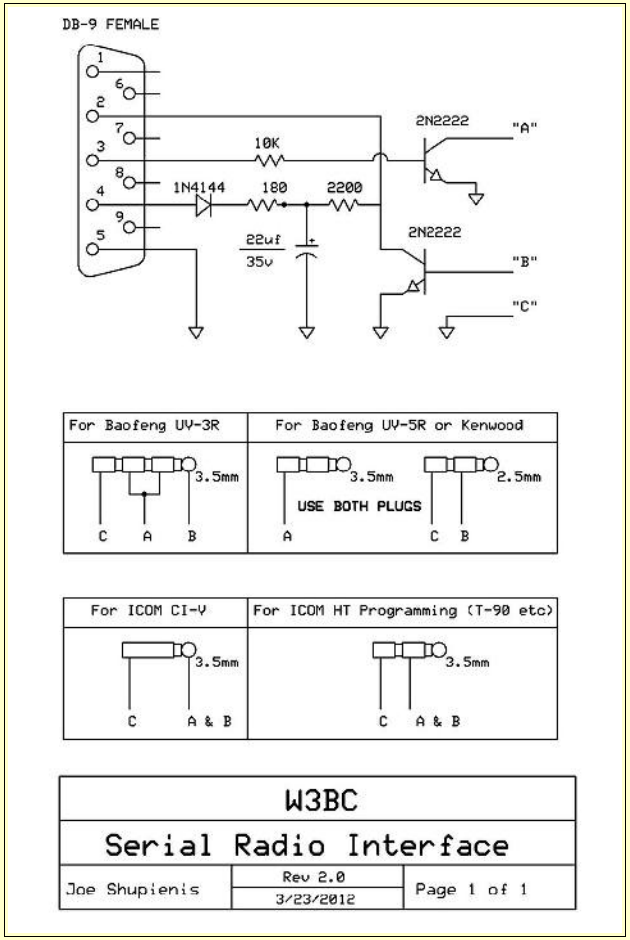
Serial Radio Interface Mk II

by Joe Shupienis W3BC

WHEN I received my new Baofeng UV-5R, I found that I needed to add the correct connectors to the interface circuit described in last month's issue (at right).

I put a little more thought into the design, and split it at the “breakout points” A, B and C. Connections are made to the corresponding pins on the radio-specific plugs, and it works just fine.



“The nice thing about standards is that you have so many to choose from.”

– Andrew S. Tanenbaum, PhD.

Original Article

I DECIDED to follow the time honored amateur radio tradition of homebrewing, and scoured the Internet to find a circuit. There were several, but they weren't specifically designed for this radio.

I finally decided that I'd be better off designing one from the ground up. (Pun not intended!) I started by identifying what the circuit had to do: convert the RS-232 +6v and -6v levels to the +3.5v and 0v CMOS logic levels the radio uses, and run under its own power.

Another design criterion I prefer to use is that all the parts should be available locally. After all, what's the point of building one if you can order a ready-made unit and receive it sooner—and cheaper—than your parts order from DigiKey or Mouser?

Radio Shack still stocks NPN switching transistors, small signal diodes, resistors and capacitors, perf-boards and DB-9 connectors, so there were almost all the parts waiting just a couple miles away. The only “exotic” part was the 4-terminal 1/8 inch audio plug. I dug up an old cellphone headset which used that plug, and after determining I had no further use for it (it wasn't wired correctly to use it as a speaker-mic for the radio), I cut the cord about a foot from the end and prepped it.

Now, it was simply a matter of laying out the parts on the perf-board, and soldering everything together.

Circuit Description

My level converter uses the switching transistors as switches—when the input logic from the computer goes from 0 (+6 volts) to 1 (-6 volts) the transistor goes from saturation to cutoff, and goes from TTL 0 (0 v) to TTL 1 (>3.5v) and sends the signal to the radio at the proper voltage level. Similarly, the other transistor receives TTL 0 (0v) and 1 (>3.5v) and switches between saturation and cutoff to switch the RS-232 RxD line from +6 to 0 volts which while not technically “correct” is an acceptable level transition for modern computers with UARTs.

Pullup voltage is obtained by rectifying the +6 volts from the pin 4 DTR signal from the computer and building up a charge in the 22uF capacitor. The voltage is stabilized and converted to the appropriate level by the 180-ohm and 2.2 K resistors.

The 10K resistor between DB-9 Pin 3 and the base of the transistor is optional. My unit works better with it, but you may not need it.

On the Job

This simple circuit works very reliably. It transfers the entire memory contents of the radio in seconds. After all that programming, you feel a sense of relief, knowing you can restore those settings in a few seconds, should your ever “misprogram” the radio.

The manufacturer's software as well as the open-source “CHIRP” program both work flawlessly with this interface.

The only time it didn't work for me was when the radio was receiving a signal. The received audio confuses the program, and it reports that the serial port is “not found.” The cure is to remove the antenna, close the squelch and be careful not to transmit.

See More PE

by Joe Shupienis W3BC, Publisher

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