

Bicycle Mobile on the HF Bands

An easy way to implement a mobile radio system, for the operator on two wheels.

Christian Bravo, W4ALF

After experimenting with pedestrian mobile and being active with Summits on the Air (SOTA), I was looking for a new amateur radio challenge. My experiences with portable ham gear led me to the idea of adapting my mobile setup to fit on my bicycle. The two-wheel setup would allow me to be even more mobile, and still be able to communicate on the HF bands.

I've found that most successful bicycle HF implementations were for the VHF/UHF bands. The feature-rich and highly compact low-power operating equipment available makes it easy to implement a practical mobile system on two wheels. In addition to being portable, I wanted my system to be lightweight and compact.

The Radio Setup

My portable operation has had success with the Elecraft KX2 transceiver, however, other low-power radios are also easily adaptable to the bike, such as the Yaesu FT-818 or the Xiegu X5105. Using the Elecraft KX2 meant I could operate on the voice and CW modes when I was stationary. Because my radio has the 10.8 V internal battery and the antenna tuner option, it makes for a compact setup. The radio is mounted directly over the handlebars using a RAM Mount ball and joint mount.

I used the KX2 Mount by Side KX to secure the radio to the RAM Mount system. This plastic radio mount easily attached to the RAM Mount system with a VESA bolt pattern that both products support. I made an easy microphone mount with a plastic clip I found at home, which I zip-tied to the handlebars. I added a second RAM Mount to hold my iPhone, and downloaded the HamLog app, so I could use my phone as a logger. The app also allows you to easily export your log in ADIF format so you can import it into your main logger software.

The Bike

I utilized my 16-inch wheel-folding bike for its compactness and dimensions, allowing me to transport it with minimal hassle. Any bike that can fit a rear bike rack attached to the frame will work. Avoid seat tube-style rear rack carriers, as they don't provide the stability needed to ride with a vertical antenna attached. The



Christian Bravo's, W4ALF, bicycle mobile setup.



Christian Bravo's, W4ALF, bicycle mobile folded to fit in the trunk of his compact vehicle.

side-to-side torque while pedaling can cause this type of rear rack to shift. I recommend using a bike that allows for a fixed rear bike rack, which lets you properly secure an antenna mount. My radio is connected to the rear rack antenna mount via RG-8X coax routed along the bike frame and secured with zip ties.

Mounting the Antenna

The idea for the antenna and mounting system came from my experience with backpack mobile setups. Essentially, I utilize a shortened vertical antenna with a coil that can be tapped for various bands through 20 meters, and a raised counterpoise wire coiled around a 7-foot crappie pole attached to the rear rack of the bike. I decided to use a Buddipole coil, antenna arms, and telescopic whips, because I already had them. Building a bicycle mobile allows a lot of room to homebrew.

The Buddipole pieces I used were four 11-inch arms, one mini coil, and the standard 66-inch telescopic whip, with the last whip section shortened to about 8 inches. This gives an approximate vertical height of about 9 feet (110 inches) when set up for 20 meters.

The counterpoise consists of a fiberglass fishing rod extended 90° in relation to the vertical section and it extends about 87 inches with a 20-foot, 18-gauge wire coiled around it. The fishing rod is then zip-tied to the rear bike rack, allowing the counterpoise to be suspended off the ground, avoiding losses and potential hang-ups of the wire while riding.

For the antenna mount, I used a Super Antenna UM2 SuperMount Universal Portable Antenna Mount for my MP1 portable antenna that pairs well with the Buddipole system, which uses 3/8-24 inch threads to interconnect pieces. I crafted two pieces of metal to use as an attachment for the MP1 portable antenna mount to the rear bike rack. The vertical Buddipole antenna and the counterpoise both connect to the MP1 mount. The whole antenna mount system could also be easily homebrewed.

I found that bringing a small antenna analyzer with me really speeds up antenna adjustments. I also haven't had any problems tuning to at least 1.5:1 voltage standing wave ratio (VSWR) or lower across the 20-meter band with this setup. I adjust for resonance by moving the tap on the coil, adjusting the vertical telescopic whip, and fine-tuning it by adjusting the counterpoise length.

Performance

I've found that my outings always result in plenty of voice and CW contacts, comparable to the wire antenna portable setups I've used. I wanted to test how well the bicycle mobile antenna system was getting out there on 20 meters, so I hooked up the antenna to my SOTABeams WSPRlite for 20 minutes during ARRL Field Day. When I checked the results, I was pleasantly surprised to see a few dozen US and DX hits all over the world!

Conclusion

Operating bicycle mobile is a fun way to get out and operate while getting some exercise. Gear today lends itself well to having a high-performing HF setup on the go with two wheels. My antenna system allows for more bands and radials while operating stopped at a location without having to hang antennas. I hope the ideas presented here spark your own mobile adventures and homebrew modifications.

For a brief video by the author on how to set up your bicycle mobile, visit <https://youtu.be/bC9s6ZqtL4o>.

All photos by the author.

Christian Bravo, W4ALF, earned his Amateur Extra-class license in 2014. He has achieved ARRL DXCC on seven bands and other awards, and is a CW instructor with CWops CW Academy. Summits on the Air (SOTA) and portable CW operations are his favorite styles of operating. He's currently enrolled in a coding bootcamp to become a Java developer. He can be reached at w4alf@arrl.net.

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