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DIGITAL EDITION



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QST Reviews

Yaesu FT-4XR Dual-Band Handheld FM Transceiver

Buddipole POWERplus and **POWERmini** DC Power Management Systems

MFJ-1780 Box Fan Loop Antenna

INRAD W1 Headset

QRPGuys Digital Field Strength Meter Kit

DIGITAL FEATURE

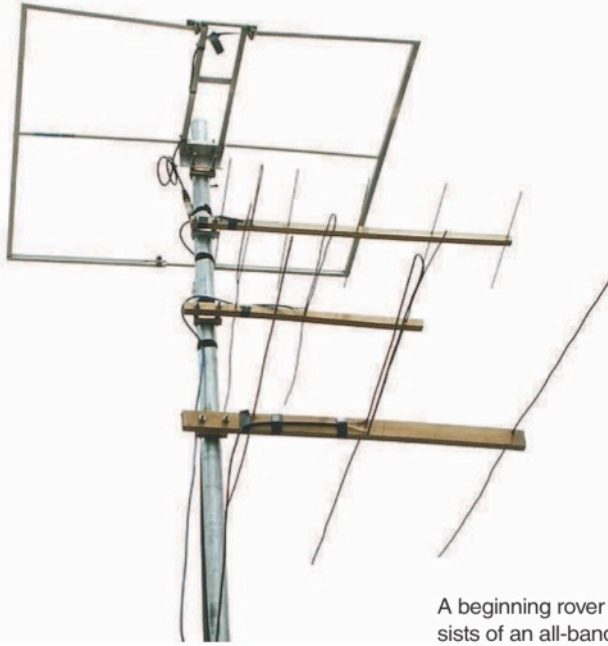


50 | See our Video Overview of the **Yaesu FT-4XR** Dual-Band Handheld FM Transceiver.



Introduction to VHF+ Roving

Learn the basics just in time for ARRL's June VHF Contest on June 8 – 10, 2019.



Ward Silver, N0AX

If you haven't tried roving yet, it's time to think about turning geography and contest rules to your advantage by combining road trips and radio as a rover.

Rovers are "enhanced" mobile stations that operate during VHF, UHF, or microwave (VHF+) contests. They make contacts from different grid squares, the sought-after *multipliers* in VHF+ contests.¹ Some rovers operate while in motion, but single operators usually operate from a series of fixed locations as a hybrid of mobile and portable. Frequent rover Andrea, K2EZ, enjoys that once she moves to a different grid square, everyone can contact her again, creating a steady stream of contacts — and boosting scores.

The Basics

Rovers use SSB, CW, FM, and even digital modes like FT8 or MSK144.

Above — James Duffey's, KK6MC, stack of homebrew antennas: a 6-meter halo and three of WA5VJB's "cheap Yagi" designs with three elements on 144 and 222 MHz and six elements on 432 MHz. [James Duffey, KK6MC, photo]

A beginning rover station often consists of an all-band transceiver, such as an Icom IC-706/7000/7100 or a Yaesu FT-857/897, and simple antennas for one or all of the 50, 144, and 432 MHz bands. Adding 222 MHz with a transverter is a frequent upgrade. Base station transceivers — such as an Icom IC-9100 or Kenwood TS-2000 — also work well, although they are larger than radios designed for mobile use.

Antennas can be mounted on your vehicle or set up along the way. There are as many different rover setups as there are rover stations — doing it your way and learning each time out is part of the fun.

Rover Station Power

To create a successful rover station, one of the key factors is power, both dc and RF. A direct connection to your vehicle's battery is the best source of dc power.² Be wary of using a power outlet or lighter socket — those are often limited to a few amps, and you may blow a fuse or overload a circuit.

An auxiliary deep-cycle battery can also be used. However, if the battery is not charged by the vehicle, a 100 W radio will drain it fairly quickly. A large-capacity battery will last for a day or less before needing to be recharged.

Typically, 12 V radios really need 13.8 V, which is the normal vehicle voltage while charging the battery. Voltages lower than 12 V can result in erratic operation and poor signal quality. You may find it easier to operate with the engine running to charge the batteries.

On the RF side, start roving with 25 W of output or more to make the most of your small antennas. All-mode radios usually produce a full 100 W on 50 MHz and somewhat less on 144 and 432 MHz. You can use a simple solid-state amplifier to boost low-power signals. (Remember to account for the power draw of the amplifier when making your power connections.) QRP or handheld radios are not recommended for beginning rovers.

Antennas for Roving

The other key component to successful roving is antennas. For SSB, CW, and digital contacts, use horizontally polarized antennas. Halo and Moxon antennas are popular on 6 meters and are sturdy enough to use while driving.^{3, 4} On the higher bands, small Yagis work well and can be homemade (see the lead photo).⁵ For FM contacts, use a regular mobile whip (a 2-meter, $\frac{5}{8}$ -wave whip also works well on 6 meters). For portable setups, use a 2-meter/70-centimeter dual-band gain antenna.⁶



Figure 1 — Jim's, K5ND, drive-on base secures the bottom of his painter's pole, and he stabilizes the mast with an attachment to a roof rack. [Jim Wilson, K5ND, photo]

Your rover can be a simple portable station. Antennas don't have to be mounted on your vehicle. Drive to your operating location and set up a simple tripod and mast. This takes a little more time at each stop, but it's easy and effective.

There are many ways to get your antennas in the air. The easiest is a telescoping mast like a painter's pole or fiberglass mast with locking sections. A drive-on base can be simple — a piece of lumber with a pipe flange with a short, threaded pipe stub attached (see Figure 1). Roll a tire onto the mount, add the mast, secure it to the vehicle's body or roof rack, and up go the antennas. If you have a trailer hitch, you can use U bolts to clamp a telescoping mast or painter's pole to a hitch-mount bike rack. Turn the mast by hand and use a compass to determine which direction the antennas are pointing.



Figure 2 — Pool noodles or foam blocks get your feed lines into the vehicle with some weather protection. Slit the foam to seat on the glass or frame and raise the window until the feed lines are securely held. [James Duffey, KK6MC, photo]

Getting your feed lines into the car needn't require any holes. James Duffey, KK6MC, uses a pool noodle slit down one side on a window and around the vehicle frame (see Figure 2). Run the cables inside and raise the window until the foam compresses around them.

Operating Technique

First and foremost, read the rules. If something isn't clear, ask the contest organizers for help in understanding. Next, you must add "/R" to your call sign on the air and when you submit your log. This lets other stations know you're a rover.

Categories vary between ARRL, CQ, and other sponsors. ARRL contests have three roving categories: Classic, Limited, and Unlimited. If you use any combination of 50/144/222/432 MHz, the Limited category is for you.

Rovers in ARRL contests can have both operators and a driver. Read the rules carefully to qualify for your preferred category.

Take it easy on your first trip. Before the contest, try to find active stations in your area for tips and advice, then plan to contact them during the contest. Travel near well-populated areas with lots of VHF activity (FM and weak-signal). Multioperator and well-equipped single-operator stations are good to look for, as well. If other rovers are active near you, get their schedules and try to contact them.

The busiest time for a VHF+ contest is generally in the first few hours, so be on the air right at the start.

Know the SSB/CW calling frequencies for each band (50.125, 144.2, 222.1, 432.1 MHz) and the national FM simplex channels (50.525, 146.52, 223.5, 446.0 MHz). Listen to find out how the calling frequency is used in your area. Stations may just take turns making contacts on-frequency, or they may move to a nearby frequency (moving up in 5 kHz steps is common) or adjacent channel if the frequency is too congested.

If a station asks you to "run the bands," (make contacts with them on multiple bands) respond with the bands you have gear for, and ask which one to start with. Band runs are great for working rapid contacts and extra multipliers.

Paper logging will be fine as you get a feel for how roving works. After the contest, create and submit a Cabrillo-formatted log using an online converter, such as www.b4h.net/cabforms. If you want to try computer logging, ROVERLOG (roverlog.2ub.org) has plenty of features and N3FJP's VHF Contest Log (www.n3fjp.com) is very inexpensive.

Location is Key

You can drive around to find high spots (look for towers and parking garages with open roofs), but you'll

The K5ND VHF Rover

Jim Wilson, K5ND

I operate satellites and VHF/UHF contests as a rover — even when I'm at home. My station is installed in the back of my Chevy Equinox hatchback. I use a Max-Gain Systems MK-4-HD 25-foot fiberglass push-up mast, including the heavy-duty mast mount with tilt-lock. I also use the Max-Gain guying rings, Dacron rope, and guy rope tensioners. The mast is secured to the roof-mounted cargo rack. The Teflon support in the mast mount allows very easy rotating of the mast by hand.



Figure A — The rover's radio equipment is set up on a self-contained shelving unit with the shelves adjusted to fit the equipment. [Jim Wilson, K5ND, photo]

At operating stops, the station is set up on a shelving unit with the legs cut down to fit the equipment (see Figure A). The battery on the bottom shelf provides a solid base, but I also anchor the unit with bungee cords to the side of the car.

This setup provides a stand-up position with easy access to the mast. The hatch provides a sun cover. (I can add a tarp if it's raining.) I also don't have to contort my position as much to look at the antenna to verify where it's pointing. I bring a step ladder for antenna setup, and it also serves as a stool, if needed.

have more success if you plan a route before the contest. Experienced VHF+ rovers are a good resource for effective operating spots and can offer useful advice, such as using scenic overlooks and avoiding unsafe operating locations like bridges, elevated roadways, and overpasses. Online mapping services, especially topographic maps, are also useful (see Figure 3).

Many GPS units can be programmed or set up to give your six-character grid location, such as EM48ss. Android and iPhone apps, such as *HamGPS*, *GPS Status*, or *Ham Square*, also show your grid locator,

but you should carry a grid-square map with you, just in case.

Ready? Set? Rove!

Once you get used to roving, you can operate anywhere. There are numerous VHF+ contests throughout the year, as well as state QSO parties. The better you get at roving, the more fun it will be.

Thanks to James Duffey, KK6MC; Andrea Slack, K2EZ; Jim Wilson, K5ND, and Steve Kostro, N2CEI for sharing their experiences with this exciting way to have fun on the air.

Notes

¹www.arrl.org/grid-squares

²See K0BG's website, www.k0bg.com, for



Figure 3 — Steve, N2CEI, and Sandra, K4SME, mapped out this 12-grid route through central Florida with stopping points along the way. [Steve Kostro, N2CEI, photo]

information on connection to late-model electrical systems.

³J. Clement, VE6AB, "6-Meter Halo Antenna for DXing," *QST*, Feb. 2017, p. 30; P. Danzer, N1II, "A 6-Meter Halo," *QST*, Sep. 2004, p. 37.

⁴www.k5nd.net/2014/09/stressed-moxon-ingeniously-elegant

⁵Visit WA5VJB's "Cheap Yagis" website, www.wa5vjb.com/yagi-pdf/cheapyagi.pdf, for tips on building your own Yagi.

⁶Many more antennas are described in *The ARRL Antenna Book* and are available from *QST* vendors.

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For updates to this article, see the *QST* Feedback page at www.arrrl.org/feedback.



Strays

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