

Work AO-51 with your HT!

Summary: If you can program split frequencies in your HT, you're set!

The Details: The primary FM analog voice mode for **AO-51** is workable with dual-band HTs!

In AO-51's **V/U** mode, the **UPLINK** (*to AO-51*) frequency for voice is 145.920 MHz. The **DOWNLINK** (*from AO-51*) frequency is 435.300 MHz.

First, you need to know **WHEN** and **WHERE** the satellite will be passing over your location. There are several computer programs that will tell you. Most programs are easily updated with current satellite tracking data that is available on the Internet. *Or, you can go to...*

<http://www.amsat.org/>

Using your longitude and latitude coordinates (or your grid locator – generally available from QRZ.com or some GPS receivers), you can access amateur satellite pass information - and a lot more information!

The one "absolute" for success is to **open up your squelch**. "Working the satellites" starts off as a process of finding weak signals, so don't expect the satellite to be anywhere as strong enough to break squelch like your local repeater. Sure, it's a little noisy, but that's part of the process. Noise can also be an aid in locating the satellite because when the frequency starts to exhibit **QUIETING**, that's a sure sign that you are capturing the satellite!

Use a good antenna for your handheld. A good gain whip antenna like **Pryme's AL-800**^[1] or Diamond RH77CA (BNC) or SRH77CA (SMA) will make the difference. Using an **Arrow Antennas** dual-band Yagi^[2] is better than a telescoping whip, or there is the **Elk Antennas** dual-band log periodic^[3]. If you prefer to homebrew your antenna, **Alex Diaz XE1MEX**^[4] has an excellent Yagi-Uda. **Kent Britain WA5VJB**^[5] also has designs for homebrew satellite antennas.

Set up your radio so you can tune for the **Doppler effect**. Start listening above the center frequency^[6] - you will hear the satellite sooner and clearer. When the downlink gets scratchy or fuzzy, tune down and reception should be clearer. Follow the signal down in frequency as the pass continues.



Don't hold your whip antenna upright. Vertical antennas are not as efficient, and a HT held upright isn't either. The satellite isn't on the ground (which is what HTs and vertical antennas were designed for). **TILT IT** about the same amount as the satellite's ELEVATION. This means that if you are FACING the satellite, tilt it down towards the ground from HORIZONTAL an equal amount. If the satellite is to your back, tilt it up an equal amount away from the satellite's position off the vertical. You will be surprised at the difference.

Many use headphones - especially if working full duplex. If you have an Icom IC-W32A or other 2m/70cm FM radio with two VFOs, you can listen to your own downlink (very helpful when starting out, but not necessary).

Knowing your grid locator - and having a grid locator map - is a quick way of identifying locations of what you will be hearing. The **ARRL** and **Icom** have grid locator maps: Icom's map is free and available at better amateur radio stores. In northern Arizona, the Prescott area and anything along route 69 to I-17, plus route 89 north to Chino Valley, is in grid DM34. Anything along I-40 from the east end of Kingman to just west of Parks is in grid DM35. The Verde Valley, I-17 from Camp Verde up toward Munds Park, and the area to Payson and almost all the way to Show Low is in grid DM44. The Flagstaff area is in grid DM45.

The "**three P's**" for working amateur satellites: **p**reparation, **p**lanning, and **p**atience. Not every pass is workable with an HT — so don't go after the low 10 degree passes. Pick your passes, working ones you know will give you the best chances.

When you hear others, try to find a break in the action, and announce your callsign, grid square, and op mode, like this:

"WHISKEY-DELTA-NINE-ECHO-WHISKEY-KILO, D-M-THREE-FOUR, handheld."

Some hams record their sessions for later review. Even if you don't make contacts, it helps to accustom yourself to the callsigns, voices and personalities of the other operators.

Ask questions! Find an elmer or look up the **AMSAT** area coordinator for your area. Posting specific questions on the AMSAT bulletin board (e-mail list) will also help you find answers.

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Notes

[1] The Pryme AL-800 telescopes to 34" and collapses to 10". It is packaged with a 9" rat tail - which you can use for everyday use. Use caution with this massive, heavy antenna: It has the potential of placing a lot of stress on your radio's BNC connector. Pryme claims gain figures of 3.2 dB on VHF and 5.5 dB on UHF.

[2] Arrow Antenna's Model 146/437-10WBP is a dual-band cross-Yagi design, with a duplexer built into the handle. It has three elements on 2m and 7 elements on 70cm. See it on Arrow Antenna's Web site at: <http://www.arrowantennas.com/146-437.html>

[3] Elk Antenna's 2M/440L5 dual-band log periodic has 5 elements and a single coax feedpoint. No duplexer is required – perfect for HTs! See it on Elk Antenna's web site at: <http://www.elkantennas.com/2m4405element.htm>

[4] Alex has performed a lot of work on suitable homebrew antennas for satellite enthusiasts. His Web site is: <http://xe1mex.gq.nu/antenas/yagi.html>

[5] WA5VJB's web site: <http://www.wa5vjb.com/references.html>

[6] For example, here's how WD9EWK's VX-3R is programmed for **AO-51**:

<i>Ch #</i>	<i>Name</i>	<i>TX Freq</i>	<i>RX Freq</i>
101	AO51-1	145.920	435.310
102	AO51-2	145.920	435.305
103	AO51-3	145.920	435.300
104	AO51-4	145.920	435.295
105	AO51-5	145.920	435.290

No PL tones are required for AO-51.

The next chart shows how the same VX-3R is programmed for **SO-50** and **AO-27**. These satellites use the same frequencies; SO-50 requires PL tones when transmitting to the satellite, and AO-27 does not:

<i>Ch #</i>	<i>Name</i>	<i>TX Freq</i>	<i>CTCSS</i>	<i>RX Freq</i>	<i>CTCSS</i>
201	SO50ON	145.850	74.4	436.810	None
202	SO50-1	145.850	67.0	436.810	None
203	SO50-2	145.850	67.0	436.805	None
204	SO50-3	145.850	67.0	436.800	None
205	SO50-4	145.850	67.0	436.795	None
206	SO50-5	145.850	67.0	436.790	None
207	SO50-6	145.850	67.0	436.785	None
208	SO50-7	145.850	67.0	436.780	None



www.amsat.org



www.arrl.org



www.arrowantennas.com



www.elkantennas.com