

Amature Radio Fox Hunting

Finding Hidden Radio Transmitters

What is Fox Hunting?

- Participants use radio direction finding techniques to locate a hidden radio transmitter
- Transmitter is typically hidden in a designated area
- Mobile vs Pedestrian



Who can participate?

Anyone with a receiver!

Since foxhunting does not require a participant to transmit, you do not have to be licensed.



What equipment do you need?

Only a few basic pieces of equipment are required to start:

- Receiver for the frequency the fox is transmitting on (typically VHF)
 - This can be a HT or a scanner
- Directional antenna
 - This can be homemade or purchased
- Attenuator
- Map of the area and compass

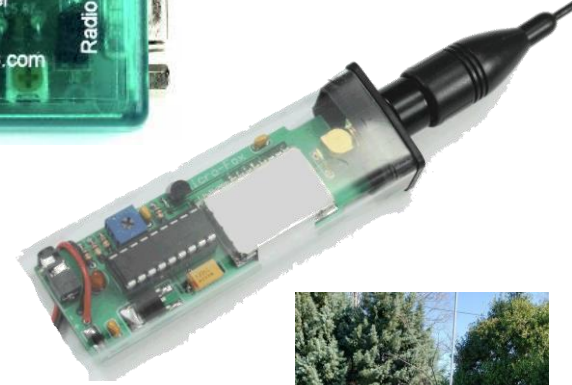
Transmitter hunting DOES NOT require expensive equipment! Compared to other ham radio activities, it is very cheap to get started in. You likely already have most of the equipment you need.

The Fox

The fox is a VHF transmitter that transmits in intervals.

Typically it is required to be hidden on public property within a certain geographic region.

Output power may vary based on the type of fox hung (such as pedestrian vs. mobile)



What kind of receiver?

Any portable receiver (HT, scanner, etc.) that receives the fox frequency (usually 2-meter band).

A functional s-meter is very helpful

- Many of the newer Chinese radios do not have a functional s-meter



Antenna options:

There are several antenna options for fox hunting, ranging from purchased antennas to homemade.

Yagi antennas are very common because of their directional nature. Some commonly used versions are:

- Homemade tape measure antenna
- Arrow's Arrow II or other purchased handheld Yagi



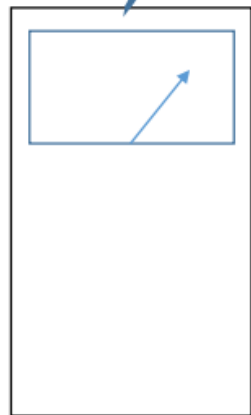
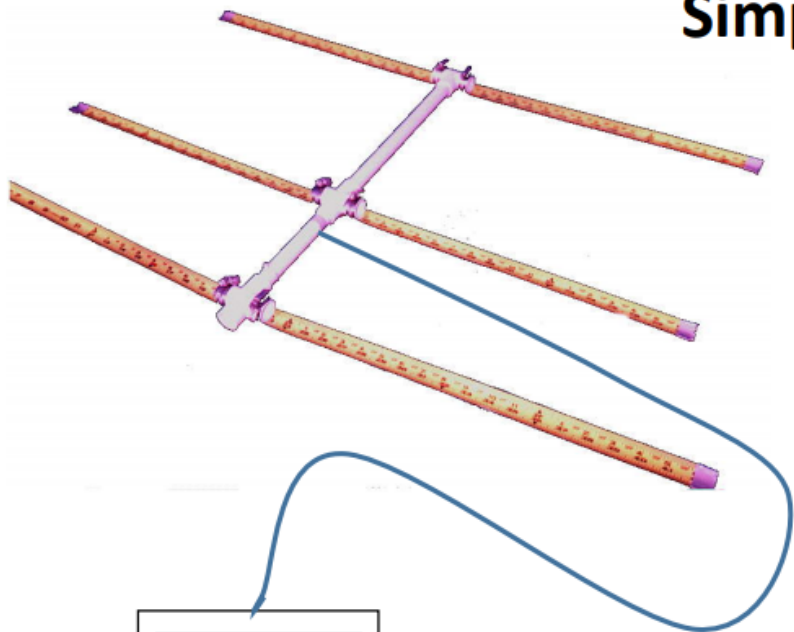
Arrow II Hand Held Portable
If Simple is Good, then this is Truly
Simply the Best

The Boom & Elements have plastic end caps for safety.

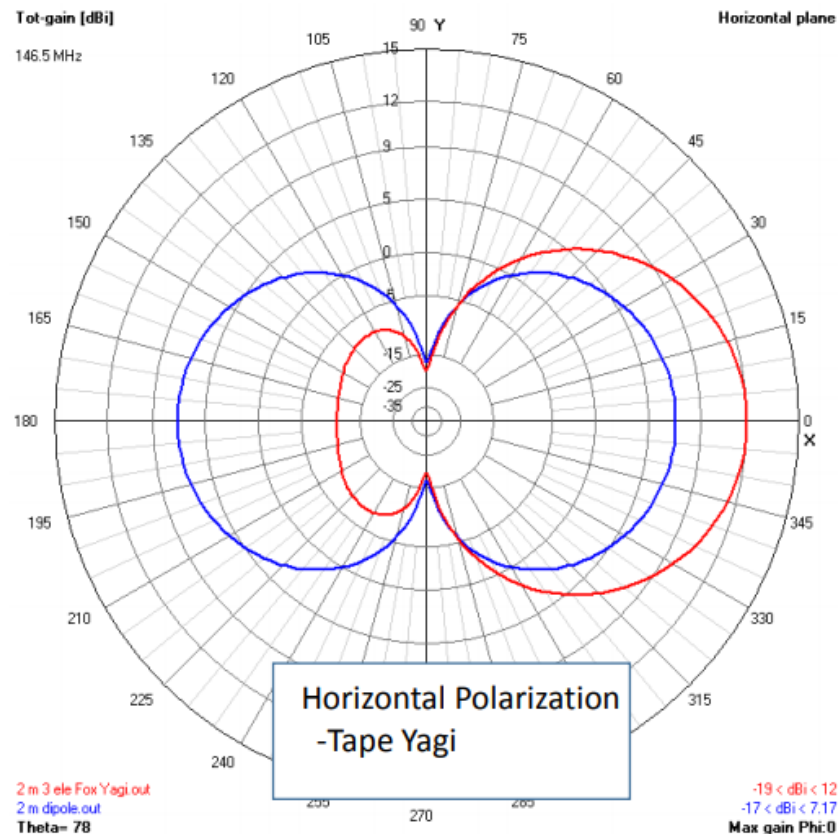
The boom is square, but has rounded corners. The handle has a thick black foam grip for easy holding.

Assembly Instructions
Attach the elements to the boom, by screwing the elements together through the hole in the boom. Attach feed line to the BNC connector. That's it. The antenna is pre-tuned and ready to go.

Simple Home Made Tape Yagi Antenna



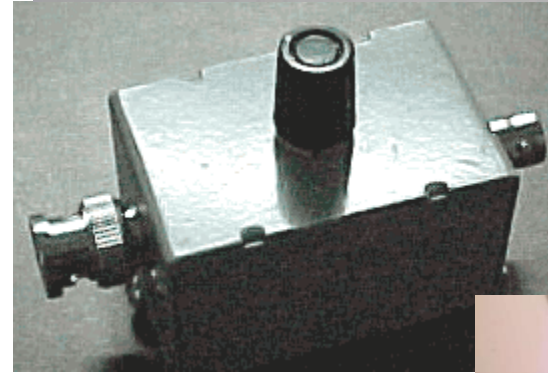
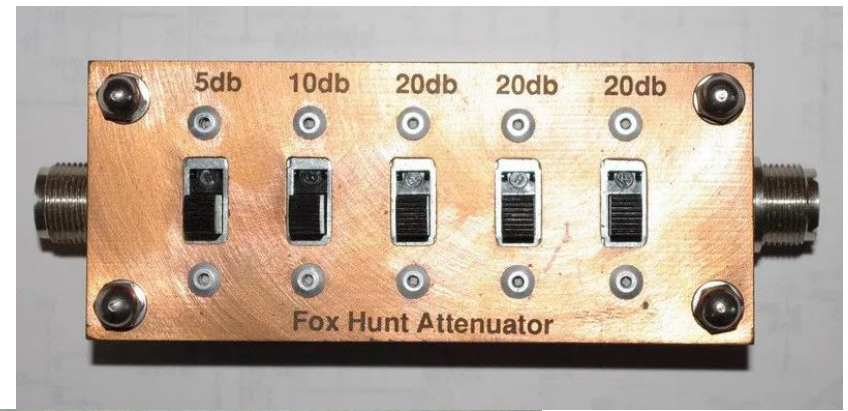
VHF Radio
with S-meter



Why an attenuator?

Once you get relatively close to the transmitter, the signal will become too strong to determine an accurate direction.

An attenuator attenuates the signal to allow you to continue homing in.



Why a map and compass?

A map and compass allow you to document the direction of your signal and triangulate the transmitter's location.

You will be taking compass readings of the direction of the transmitter to transfer to your map.

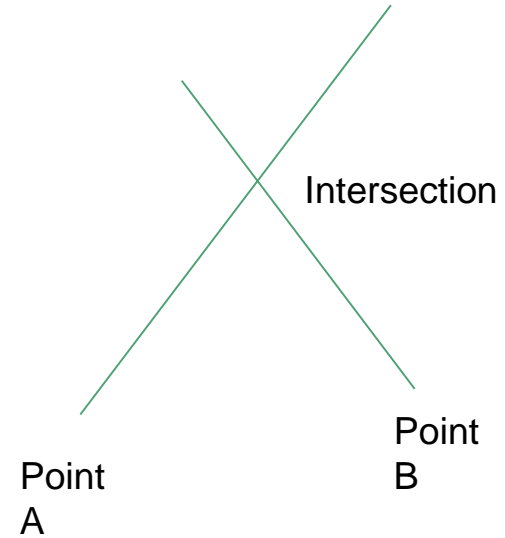
Spend some time understanding how you use a compass if you are unfamiliar.



Techniques: What is triangulation?

Basics:

- Finding the signal and getting an initial reading
- Taking at least one other additional reading
- Triangulation
 - Plot both reading locations on a map and draw a line in the direction of the signal. Where these lines intersect gives you an idea of the potential location of the fox



Finding the Transmitter

As you take readings it is important to notes several indicators”:

- Direction of signal
- Signal Strength
- Possible changes due to terrain
- Non-radio related clues

When taking readings, try to avoid metal structures and buildings that cause multipath signals.



Basic Propagation Principles to Keep in Mind

Signals travel in a straight line until they are reflected or absorbed.

Signals get weaker the further they travel

- Increases in signal strength typically indicate you are getting closer to the transmitter

Signals lose strength at a reflection

- Put more confidence in the strongest signals

Hills and mountains can block signals between you and the source.

- Take readings from high spots where possible, avoiding large buildings.



Once you get close:

- As you get closer to the receiver, the signal will likely become so strong that you need maximum attenuation.
 - Eventually even maximum attenuation can be overpowered
- Techniques
 - Take the antenna off your radio and use “body blocking”
 - Change the polarization of your antenna for increased attenuation
 - Can give you up to an additional 20dB attenuation
 - Tune your receiver off frequency by 5 to 10 KHz
 - If you have a dual-band HT, you get will the equivalent of 40 to 60 dB attenuation by tuning it to the third harmonic of the hunt frequency.

Other related equipment:



Safety on Mobile Hunts

Watch your surroundings, especially when driving

Ensure you are driving within the speed limit

If you stop to take a bearing, ensure you are in a safe place



How is this useful in the real world?

Aside from locating hidden transmitters, the skills that amateurs develop in foxhunting can be applied to locating:

- Jammers
- Stuck mics on the repeater
- Noise interference

However, fox hunting is also just good fun!

Other types of transmitter hunting:

Mobile fox hunting, as described in this presentation, is most popular in the US. However, ARDF (sometimes called “International Style”) is more common abroad.



Amateur Radio Direction Finding:

- Pedestrian - on foot
- Typically five foxes are hidden. The goal is to find them all the quickest.
- Typically use 80m and 2m, transmitting CW



Helpful Links:

ARRL Site on Fox Hunting - <http://www.arrl.org/direction-finding>

General Info on Equipment - <http://www.homingin.com/equipment.html>

Building a tape measure antenna-

http://theleggios.net/wb2hol/projects/rdf/tape_bm.htm

Offset attenuator kit - <https://www.tindie.com/products/3rdplanetsolar/fox-hunt-offset-attenuator-kit/#product-reviews>