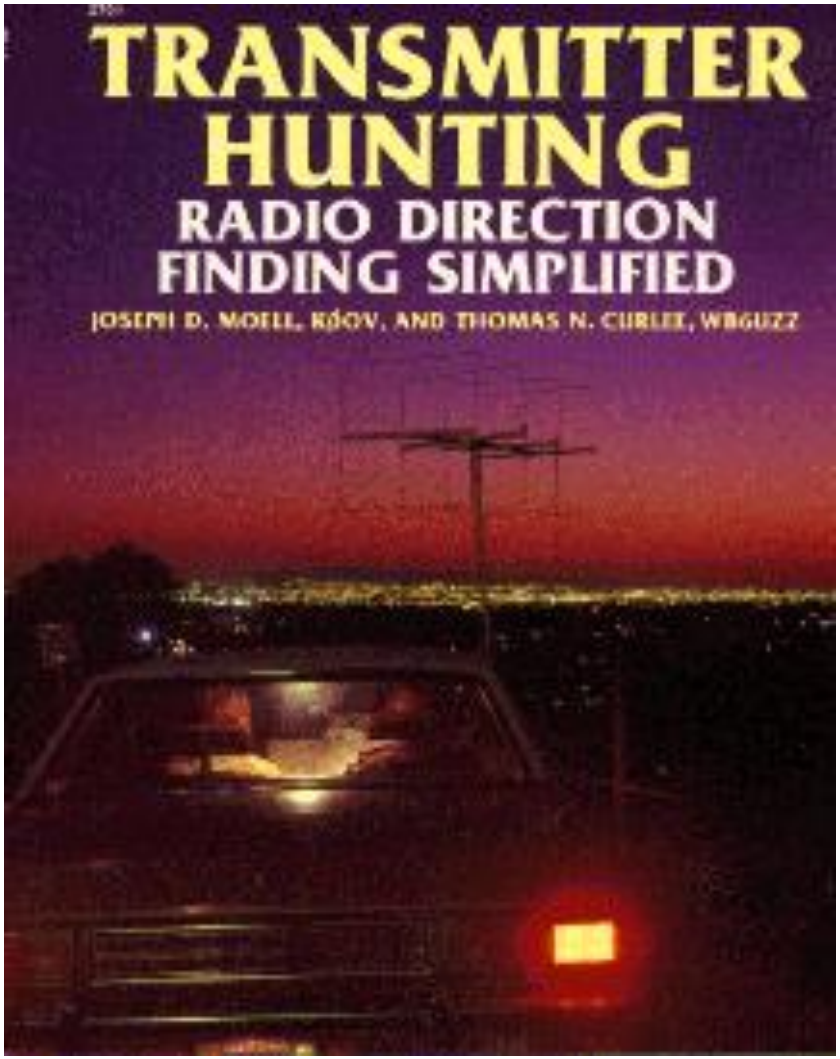


Let's T Hunt !

NFARL – July 15, 2014

Mike / W5JR

John / K4SQC

How Do You Get One of These?

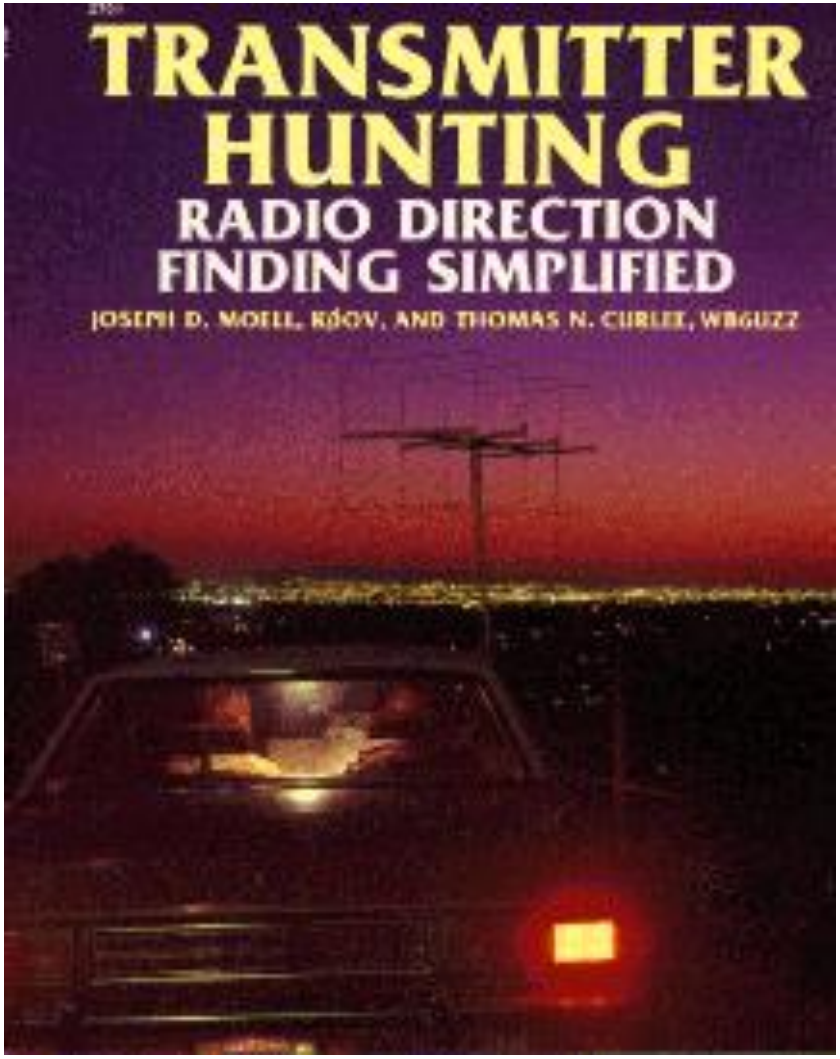
How Do You Get Started?

Hundreds of approaches and articles written

- ARRL http://www.arrl.org/direction-finding
- Homing In (KØOV) http://www.homingin.com/
- Hudson Valley Direction Finding Association http://www.n2ki.com/HVDFA/Index.htm

  Great Tips for Hunters – Body Shielding, tuning off frequency, listening to 3rd harmonic (UHF band for 2m Foxes), Gear for hunting from car or on foot
- Albuquerque Transmitter Hunters http://www.wb8wfk.com/
- WB2HOL RDF Pages http://theleggios.net/wb2hol/projects/rdf/rdf.htm
- N6QAB RDF Site http://www.qsl.net/n6qab/
- KE6HTS ARDF Site http://www.west.net/~marvin/
- WØQE Site http://www.w0qe.com/active_passive_attenuator.html
- PicoDopp http://www.silcom.com/~pelican2/PicoDopp/PICODOPP.htm

Joe's (KØOV) Book



146.565

(3rd Harmonic 439.695)
(Plus 2 MHz 148.565)
(Plus 4 MHz 150.565)

GEAR – What You Need to Start

- Radio – HT, Handheld Scanner, Mobile
- DF Antenna – Beam, Quad, Loop, Dipoles
- Attenuator – Passive, Active, Both
- Maps – Physical or Electronic
- Fox – Transmitter Suitable for Hunting

GEAR – Radio

- HT Capable of Receiving the Band of the Fox
- 2m / 440 Better if Fox on 2m (3rd Harmonic option)
- Handheld Scanner
- Purpose Built Receiver
- Mobile Radio – Useful to Begin Hunt
- Field Strength Meter

GEAR - Antenna

- Yagi (Beam) – Optimized for Deep Rear Null
- Quad – Optimized for Deep Rear Null
- Phased (Switched) Dipoles
- Doppler

Simple Phased Array

- From KØOV's Book -

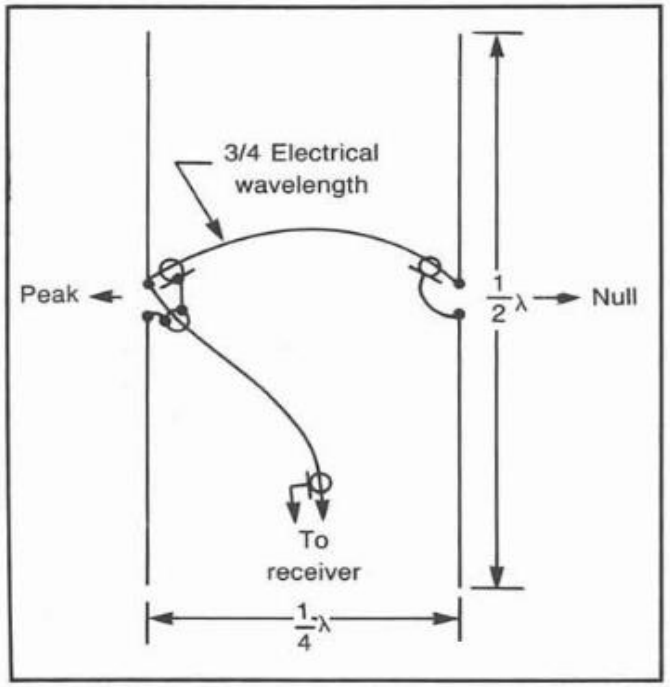


Fig. 4-13. A two element phased array. This antenna has a single null with a broad peak 180 degrees away.

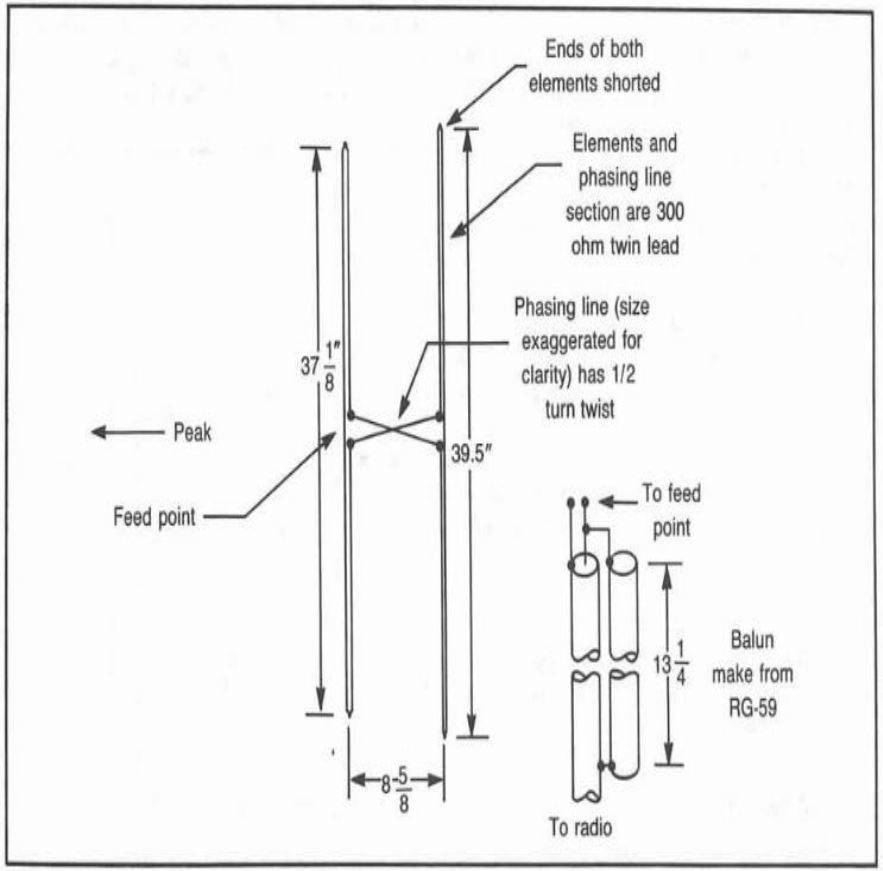
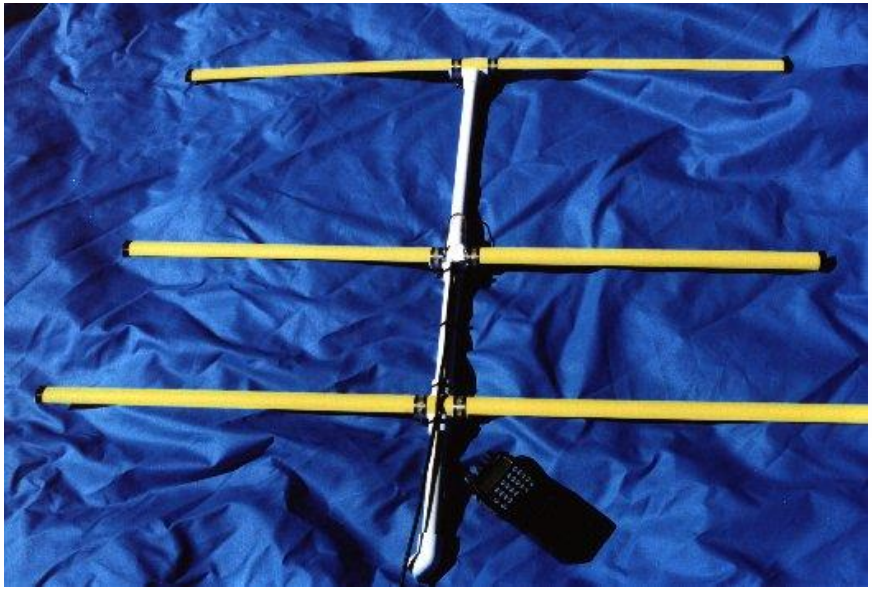
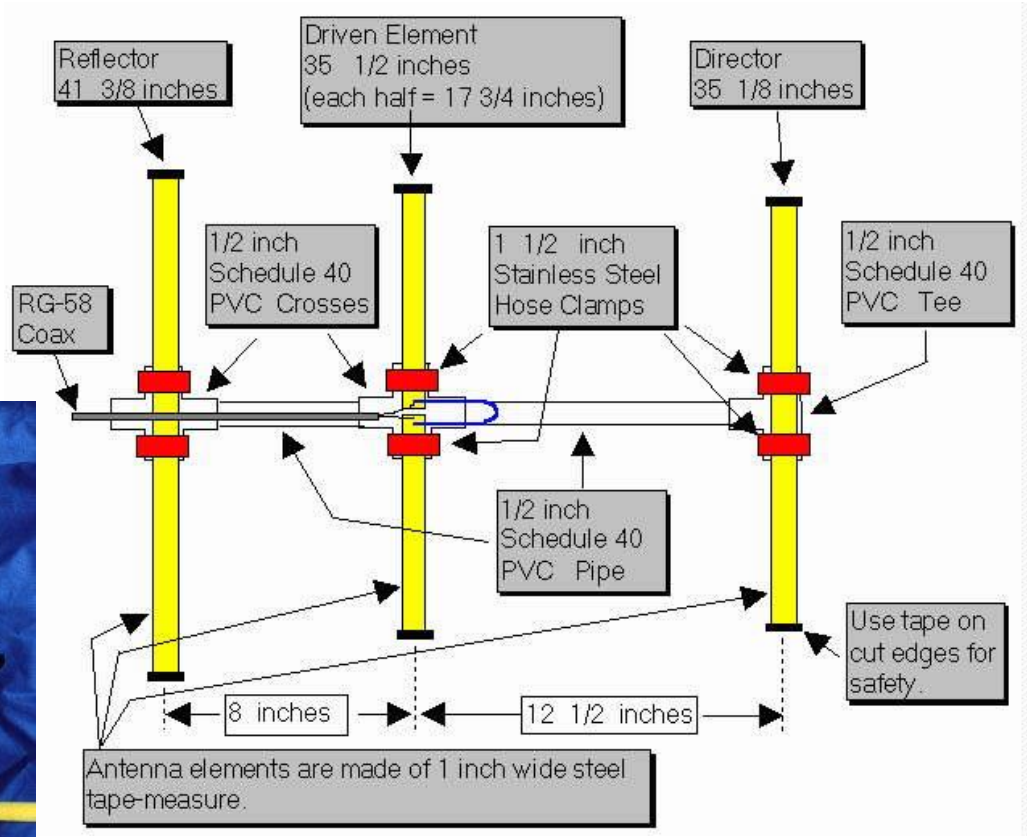


Fig. 4-15. Electrical information for a ZL Special. This antenna has a broad peak and a sharp null, 180 degrees away from each other.

WB2HOL Tape Measure Yagi





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

KE6HTS Kits

Complete WB2HOL Tape Measure Beam Kit

After putting on numerous antenna workshops prior to transmitter hunts, it became apparent that the basic antenna was not sufficient for hunting without either a receiver that included a built in attenuator, or an external attenutor. And thus The Complete WB2HOL Tape Measure Beam was born. It is the basic WB2HOL Tape Measure Beam kit, but also includes an enclosure with offset attenuator, power switch, and an output BNC connector.

The only additional thing you will need is a length of 50 ohm cable (RG-58 or RG-174 is what we use) with a BNC connector on one end, and the appropriate connector for attaching to your radio. The 9V battery is included.

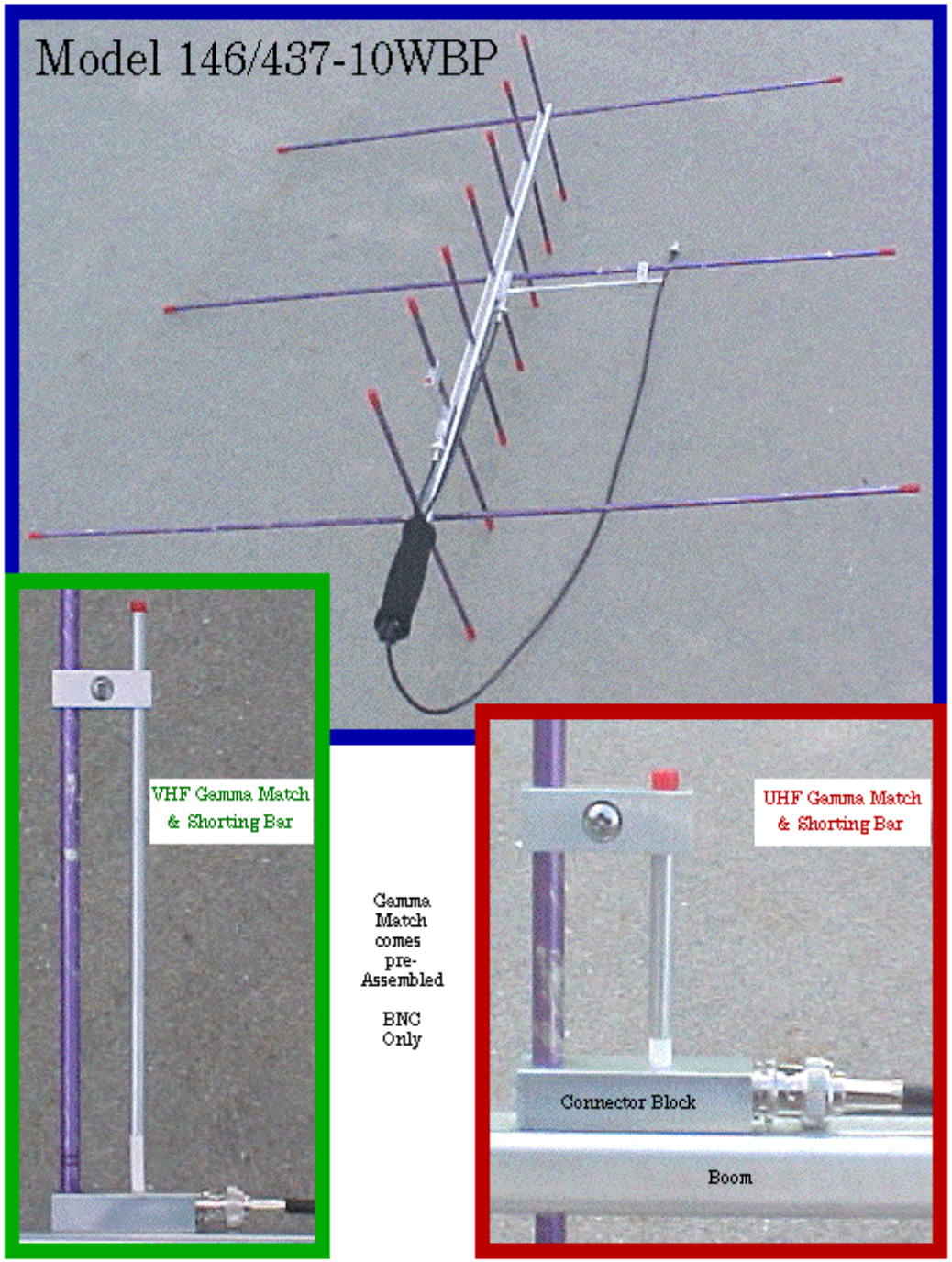
As with the Tape Measure Beam kit, the kit can be built with a screwdriver and soldering iron in less than 30 minutes depending on your assembly skills. To make it simple to build, the attenuator and enclosure is furnished as a complete assembly as shown in the bottom of the photo.

The parts included in the kit are:

Qty	Description
1	Assembled/Tested Offset attenuator w/enclosure

Antenna / Attenuator Parts

Handle with Box for Offset Attenuator (Natural and Fluorescent Orange shown)



Arrow Antenna

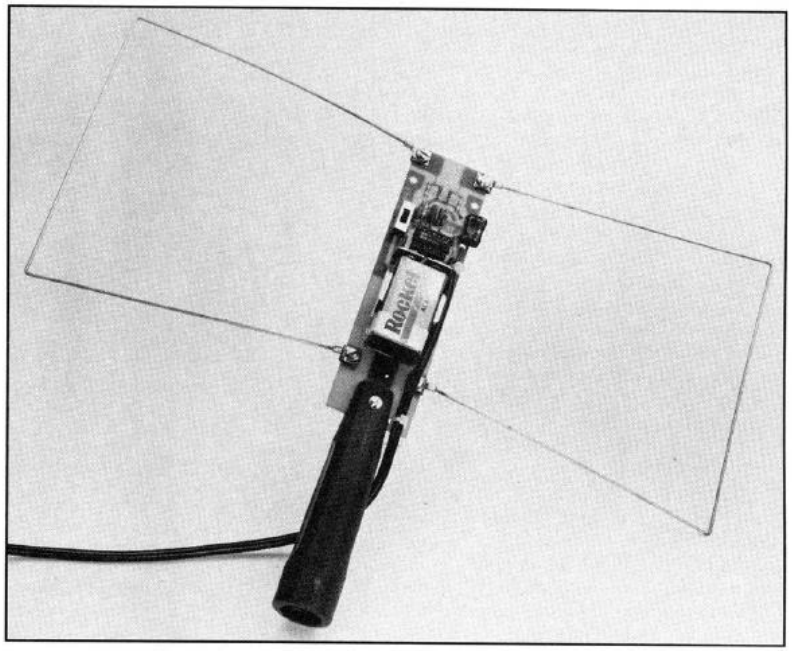
May 1993 QST

Ultra simple RDF Project

Build the HANDI-Finder!

This hand-held direction finder is great for "fox hunting"! Simply connect it to the antenna input of your H-T or FM scanner and you can locate AM or FM sources over the range of 45 to 470 MHz.

By Bob Leskovec, K8DTS
25884 Highland Rd
Cleveland, OH 44143-2722

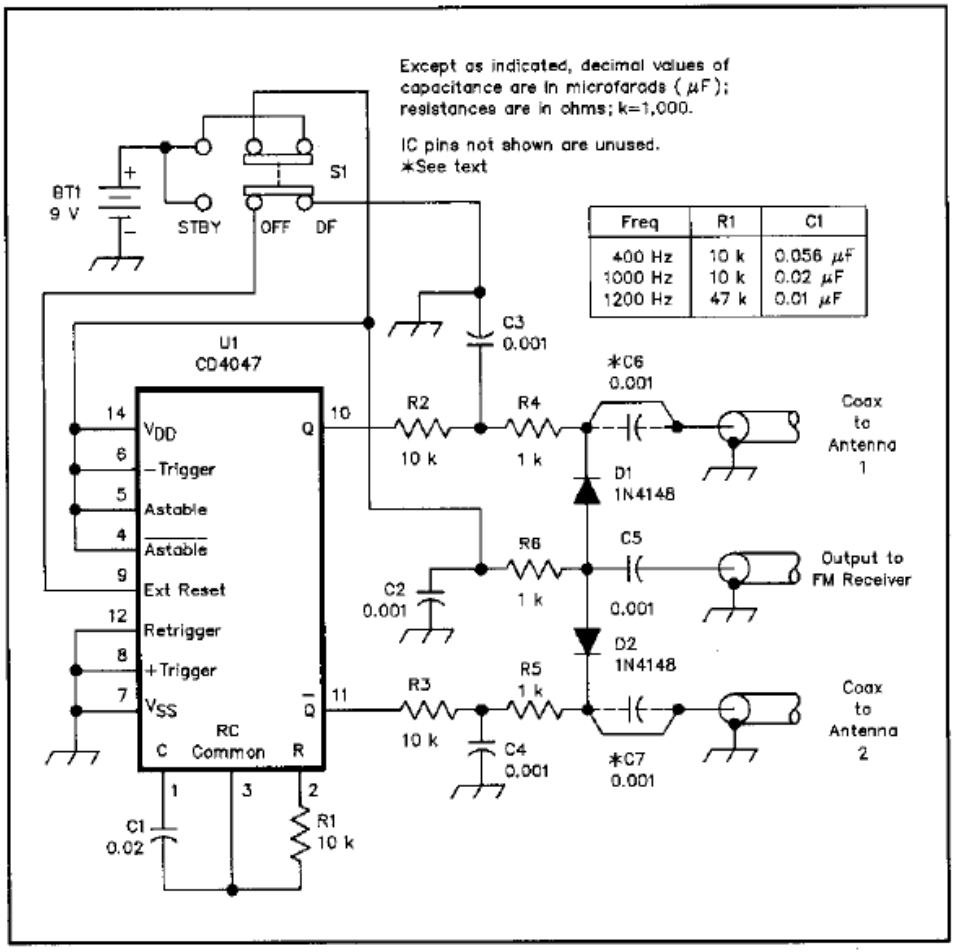


Inevitably, every Amateur Radio community experiences its share of repeater jammers. Tempers flare. A new generation of hams gets interested in direction finding. Car roofs start sprouting outlandish antenna arrays, looking more like tuna boats with every antenna addition. Fox hunts are scheduled for practice—and the jammers quickly become more evasive!

When that happened in our area a few years back, Rich James, N8FIL, of the Cuyahoga Amateur Radio Society (CARS), organized members from several area clubs into the "Bozo-Busters," and I resurrected four DOP-SCAN units[1] supplied by the Lake Erie Amateur Radio Association (LEARA). A few dedicated hams soon found themselves getting called out at all hours and driving all over town. When the gasoline bills started mounting up, we figured there had to be a better way!

Thought: Instead of a *few* hams outfitted with *special* equipment, why not have *many* hams equipped with *simple* direction find-

HANDI Finder Circuit

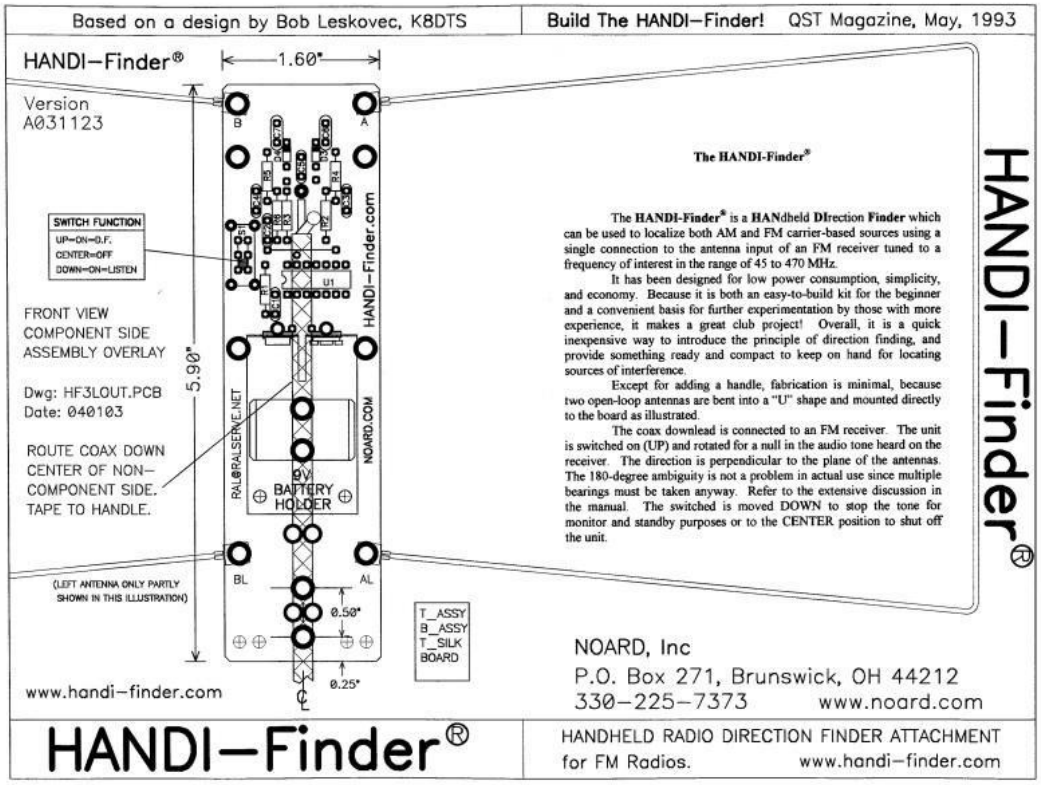


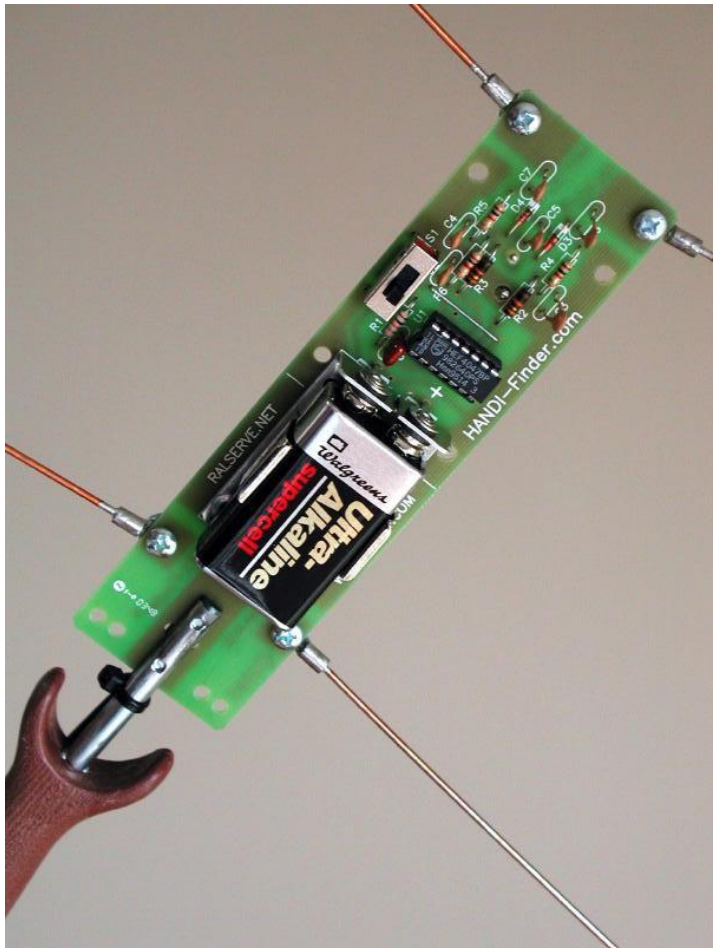
HANDI-Finder

- Uses Audio rate (~1000 Hz) antenna switching
- Null produced when both antennas receiving target signal “in phase”
- Uses TDOA (Time Differential of Arrival) principle
- Works without need for S-meter or attenuators
- Suitable for many different VHF/UHF bands
- Many modern commercial systems based on similar design

Current Version

http://www.handi-finder.com/

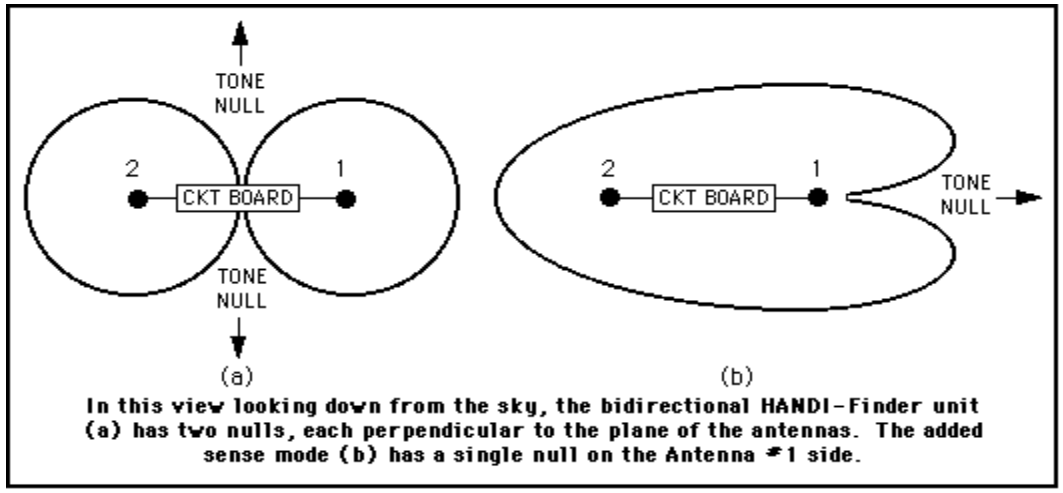




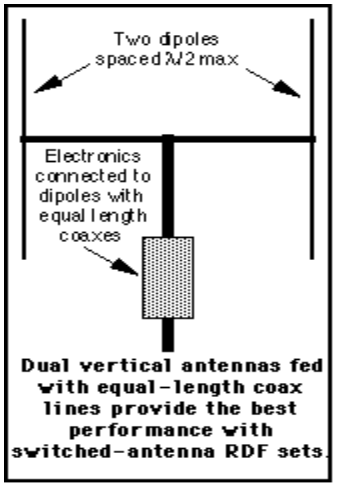
All “Good” Projects get Modified!!

http://www.homingin.com/hfinderfix.html

- Adds a “sense” mode to solve the 180° bi-directional signal
- Antenna redesign using two vertical dipoles



In this view looking down from the sky, the bidirectional HANDI-Finder unit (a) has two nulls, each perpendicular to the plane of the antennas. The added sense mode (b) has a single null on the Antenna #1 side.



Dual vertical antennas fed with equal-length coax lines provide the best performance with switched-antenna RDF sets.

GEAR - Attenuator

- Passive - Fair Performance
  - Switched Resistor Box
  - Continuously Variable
- Active – Excellent Performance
  - Heterodyne
  - Modify Receiver Gain Stages

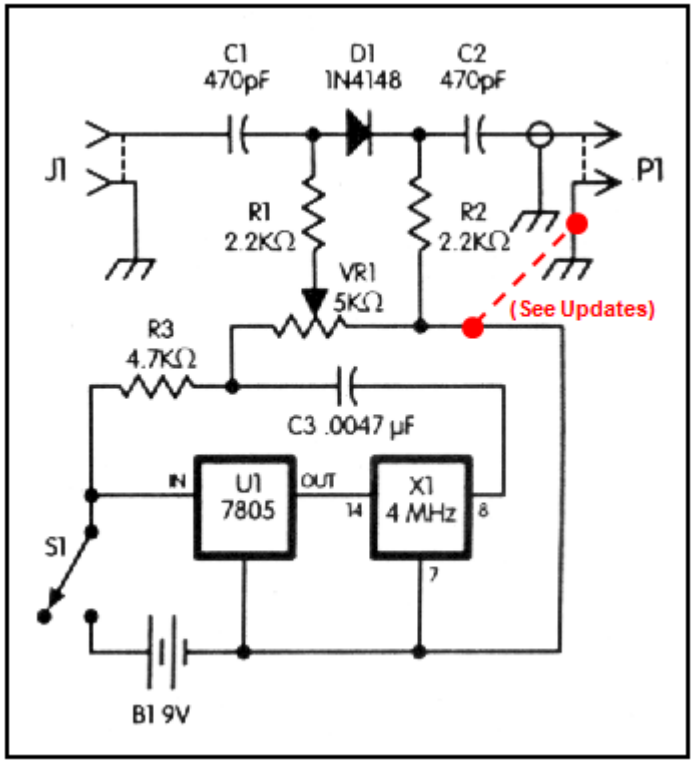
Yagi + Attenuator

- Need Radio with S-Meter
- Need Radio with built-in Attenuator
- Probably need external Attenuator for close in
- Option to use 3rd Harmonic (UHF) if on 2m
- Can Tune off frequency as signal gets stronger

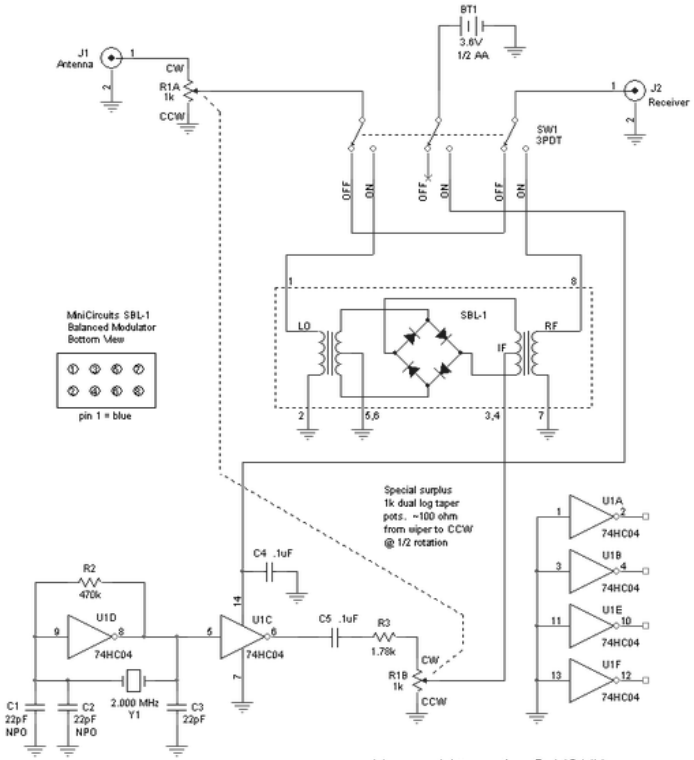
A BETTER ATTENUATOR

- Uses 2 or 4 MHz “Local Oscillator” Fed to (Balanced) Mixer
- Tune Radio to Up/Down Mix Frequency
- Vary “Injection” Level to Achieve 120+ dB

Active Attenuator - KØOV



Active/Passive - WØQE



Active/Passive 1 Knob Attenuator
V.3
Larry Benko, W0QE March 2003

Measured Attenuation @ 146 MHz

Knob Position:	Base Freq.	2 MHz. Offset
Max. CW:	1dB.	10dB.
3/4:	14dB.	25dB.
1/2:	21dB.	63dB.
1/4:	31dB.	89dB.
1/10:	42dB.	116dB.
Max. CCW:	47dB.	121dB.

Click on any pic for higher resolution image

The upper left picture shows the inside construction and the point to point wiring. The small coax is RG-316 and the super small coax is RG-178. The 2 upper pictures show the attenuator built in a 2.2" x 4.2" x 1.2" diecast box where the lower right has the attenuator built (squeezed) into a 1.4" x 3.5" x 1.1" diecast box and double sided foam taped to the back of a Yaesu VX-5. The radio can easily be held with one hand and the attenuator knob turned while the other hand is swinging the antenna.

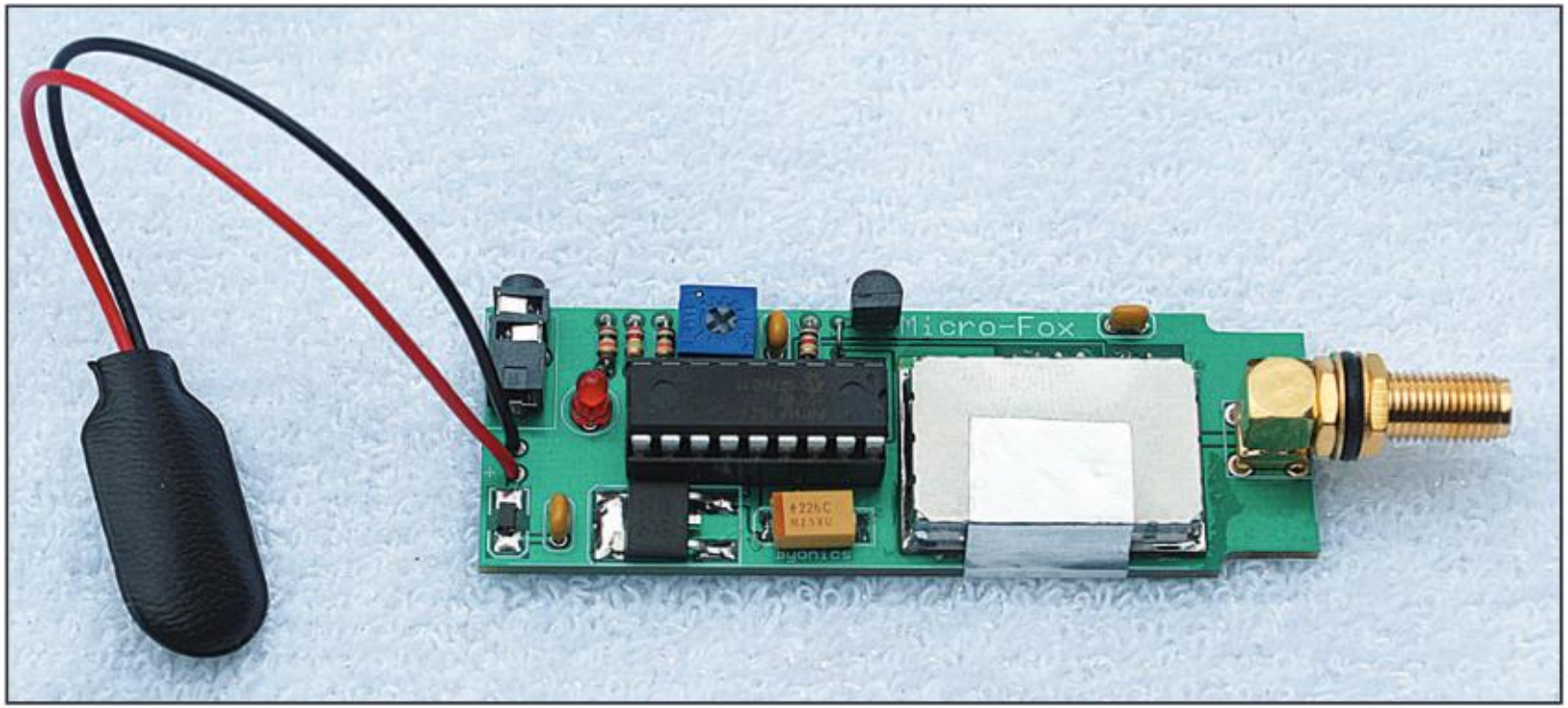
GEAR - Maps

- Paper with Plastic Overlay & Markers
- PC – Google Maps, Streets & Trips
- Phone/Tablet (iOS)
  - FoxHunt ($FREE)
  - FoxHunt Pro ($6.99)
  - Triangulex ($0.99)

GEAR - Foxes

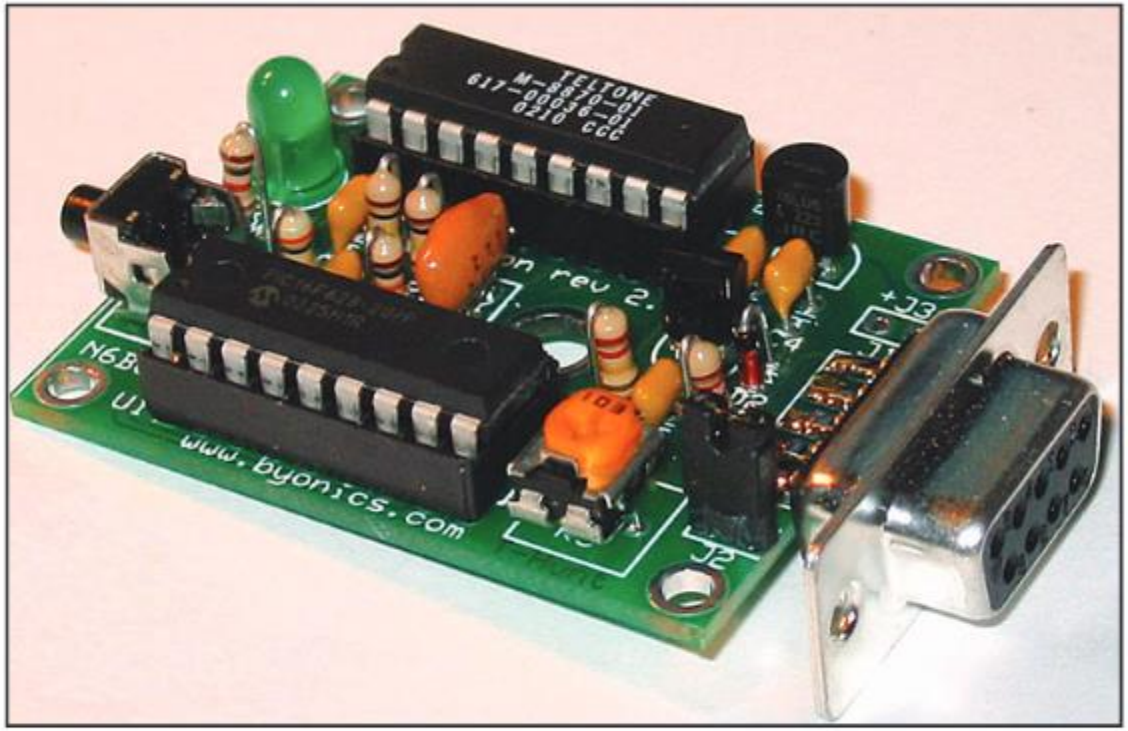
- Low Power
  - Byonics MicroFox (John has one)
  - WB6EYV
  - Asian HT
- Mobile
  - Installed or Dedicated
  - Byonics Fox Controller
  - Asian HT

Byonics MicroFox 15



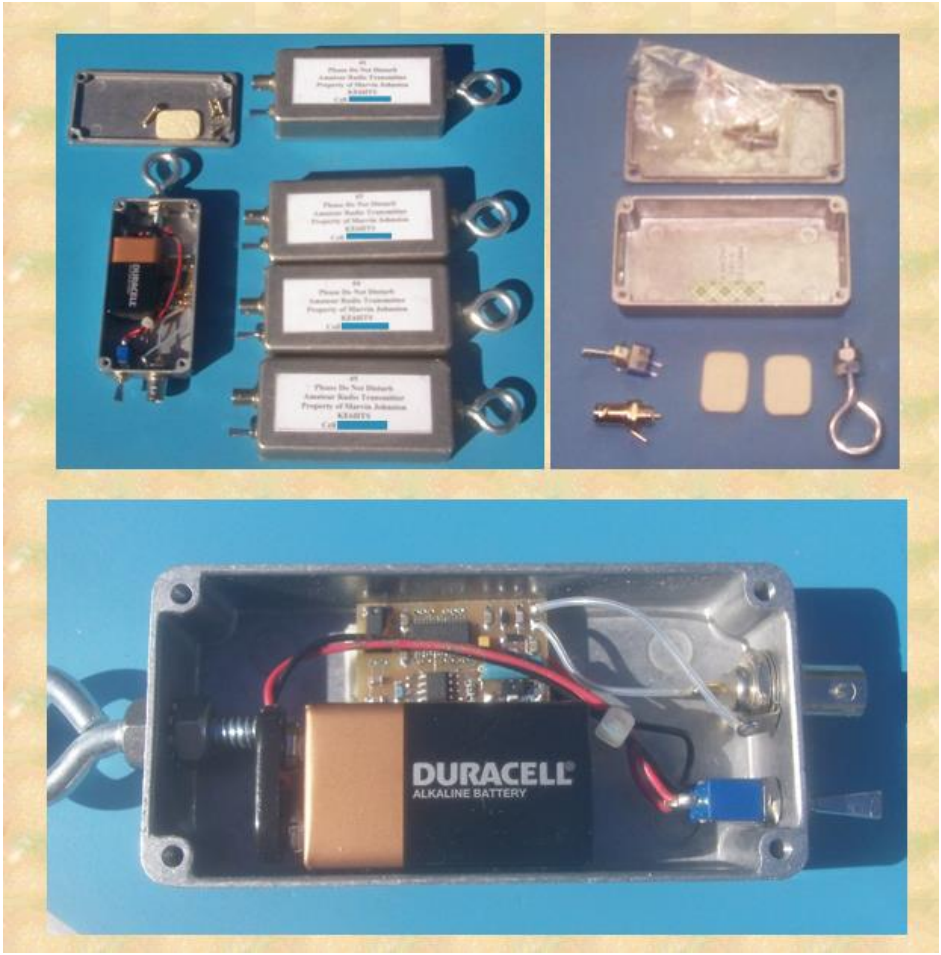
Micro-Fox 15 from Byonics is a synthesized 2-meter transmitter and foxhunt controller powered by a 9-volt battery. (Photo by Joe Moell, KØOV)

Byonics Fox Controller



PicCon from Byonics turns any VHF/UHF handie-talkie or mobile radio into a fox transmitter with distinctive tones and on/off timing. (Photo courtesy Byon Garrabrant, N6BG)

WB6EYV 50 mW Fox



GO FIND `EM !!