

VHF Experiments

...or “Putting the Tech back
on the Technician Bands”

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note page numbers for questions 1

Here I am: KK7B/KH6 September 9



Here's my VHF Bench:



while measuring temperature stability of
some VHF sources

KK7B VHF Operating Position September 2009



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First, a little History Lesson

The VHF Bands have been the historic playground for experimentally inclined Radio Experimenters

Hence: the “Technician Class” license...

...for amateurs more interested in exploring radio science and technology than handling traffic or collecting QSL cards

A Serious VHF Station from 50 Years Ago



A good HF receiver with separate receive converters for each band

A 100 watt CW Transmitter built from a kit, with separate homebrew power supply

Homebrew power supply for the converters

Lots of wires, switches, and high voltages

Note: homebrew was often a performance upgrade

Next: Some Philosophy

What to do in the second 100 years of Radio?

Combine good old ideas with carefully selected new ideas. Choose wisely, but have fun.

New = Good ...for adolescents

Old = Good ...for Civil War Reenactors

Youthful enthusiasm for anything new, and a love for preserving our history are both good... but those are different radio activities.

Let's Define an Experiment:

Something you try that might not work...

...but after you try it you will know more than you do now.

Beware of experts who haven't actually done what you propose to do.

Until you do the experiment, you don't even know what you don't know.

A Bad Old Idea That Just Won't Die:

Anything that can be hooked up to a machine....
....should be



Software Defined Violin, circa 1909

Some Good Ideas:

Inexpensive gear that encourages experiments

Calling frequencies, small nets, and band plans

Long term experiments--decades

Listen to a radio first, then hook up the computer

Note that experimental gear that requires a computer before you can hear anything will no longer work in five years.

When experimenting in your station, don't pay too much attention to someone else's opinion of what is good and bad! Play with what you think is cool. That is inefficient, but will hold your interest for long enough for you to develop knowledge and skills and slowly acquire some good tools.

The single most important key to successful VHF experimenting is to have a buddy across town to listen to your signals and share the experiments. The web doesn't quite work--you need to get on the air and experiment.

Richard K7XNK/3



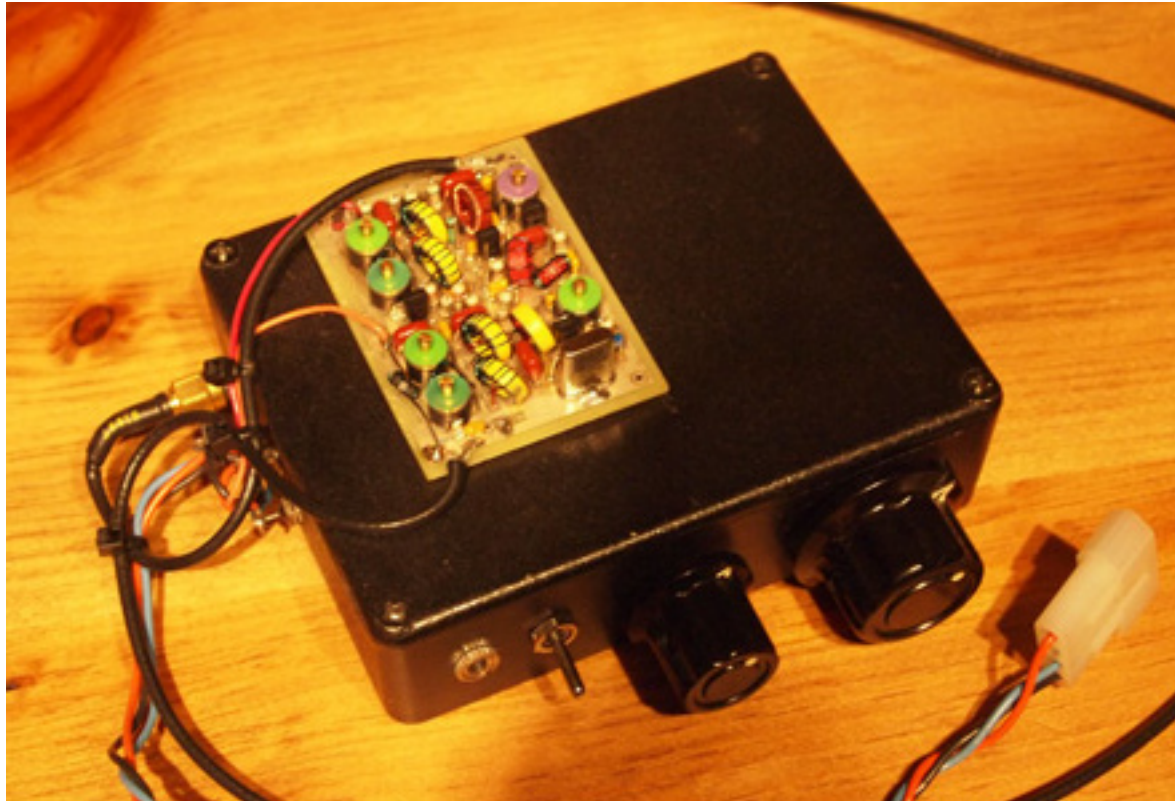
Here is an important thought:

Most radio amateurs think they have earned a license to transmit. That is false: anyone can transmit.

Radio Amateurs have earned a license to modify, design, build, and operate their own transmitting equipment and antennas. That is unique in the radio services.

You have a license to experiment on the air.

A New Experimental 6m QRP CW Station with the same old block diagram:



40 meter MicroR2 receiver in the black die-cast box with a new Rcx1 6m converter taped on top₁₅

6m VHF's
Transmitter
with 1 watt
PA

10 AA cells
TR switching
inside.

red button is
spot switch



The 6m CW transmitter and receive converter may be used with any 40m receiver or transceiver

Use your imagination and what's on the shelf in your garage...

Messing around with Envelope Modulation

A carrier is good--all the latest weak signal modes and measurement instruments have one

It gives us a calibrated way to measure signal strength so we can aim narrow antennas, optimize our system, and tell when the other guy is transmitting

It gives us a frequency reference so we don't have to keep retuning our microwave gear

Combine Envelope Modulation with good enough stability for CW and you have a very modern experimental VHF voice mode that is compatible with old, new, simple, and complex receiving gear.

How to generate AM:

Cut the power supply lead to the last two stages of your solid state FM or CW transmitter.

Insert a transformer winding in series

Drive another winding with audio

AM Q & A

Q What kind of transformer should I use?

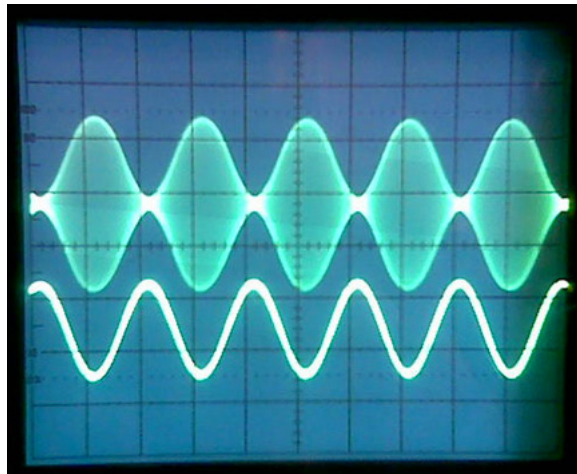
A With a filament transformer, use 1 lb per watt

Q How much audio power should I use?

A Audio power is cheap. For a 100 mW CW transmitter, have a couple hundred mW available

Q How do I adjust an AM transmitter?

A With an Oscilloscope.



If it looks good, it is good.

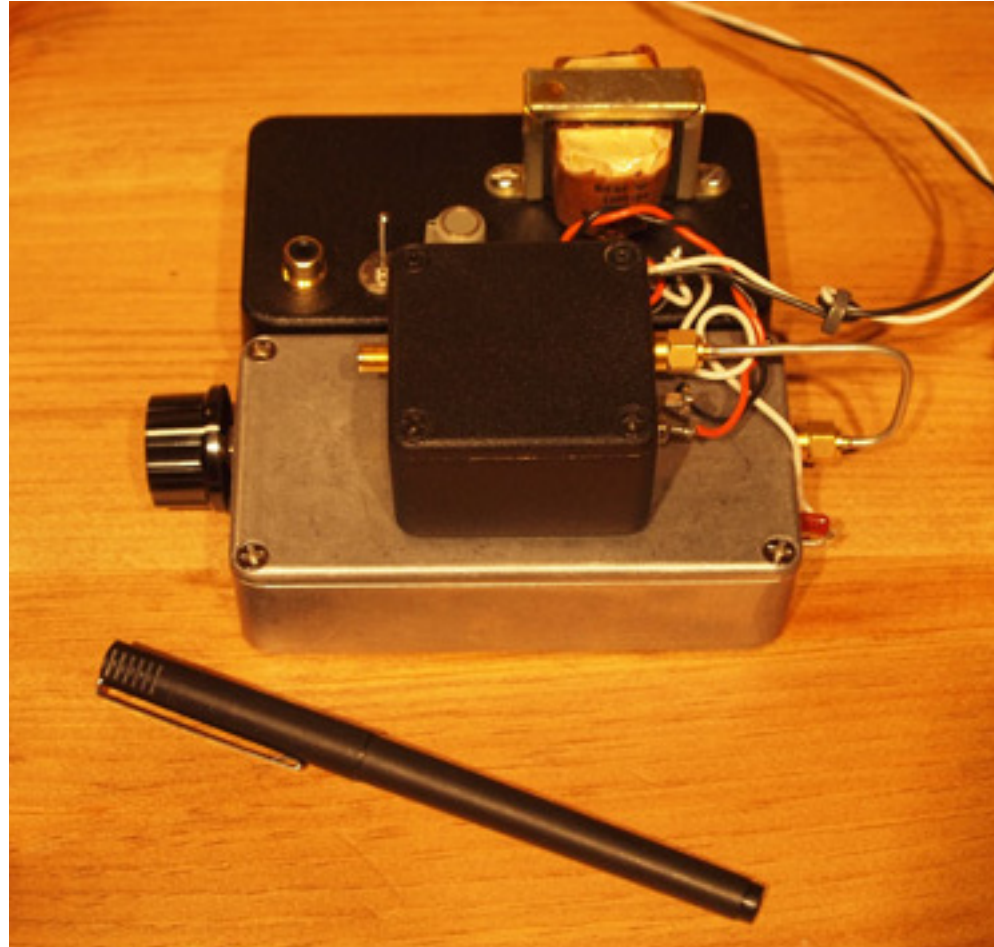
AM is a great excuse to own an oscilloscope

A Vintage 2m AM Transmitter



CW Transmitter, Modulator, and Supply 22

A Modern 2m AM Transmitter



The VHF source is in the silver box. The 100 mW PA is in the small box. The modulator is in the other box, with the little transformer on top

Ugly 2m
100mW
PA



I'd rather take the new one /7 in the Oregon Mountains



where I can listen on a Q7a handheld

A New Receiver for HF-VHF-Microwaves

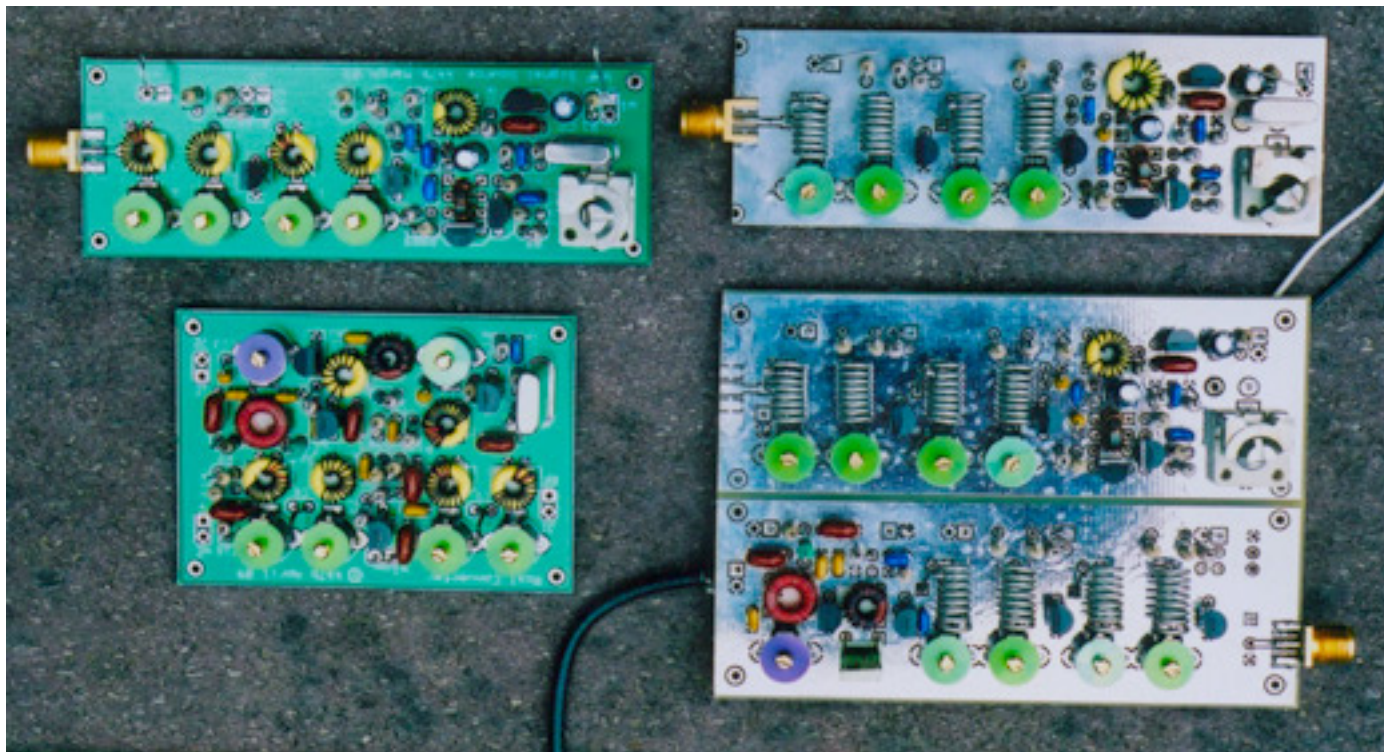


Experiments with several new analog weak signal modes

Some New Pieces available from Kanga US

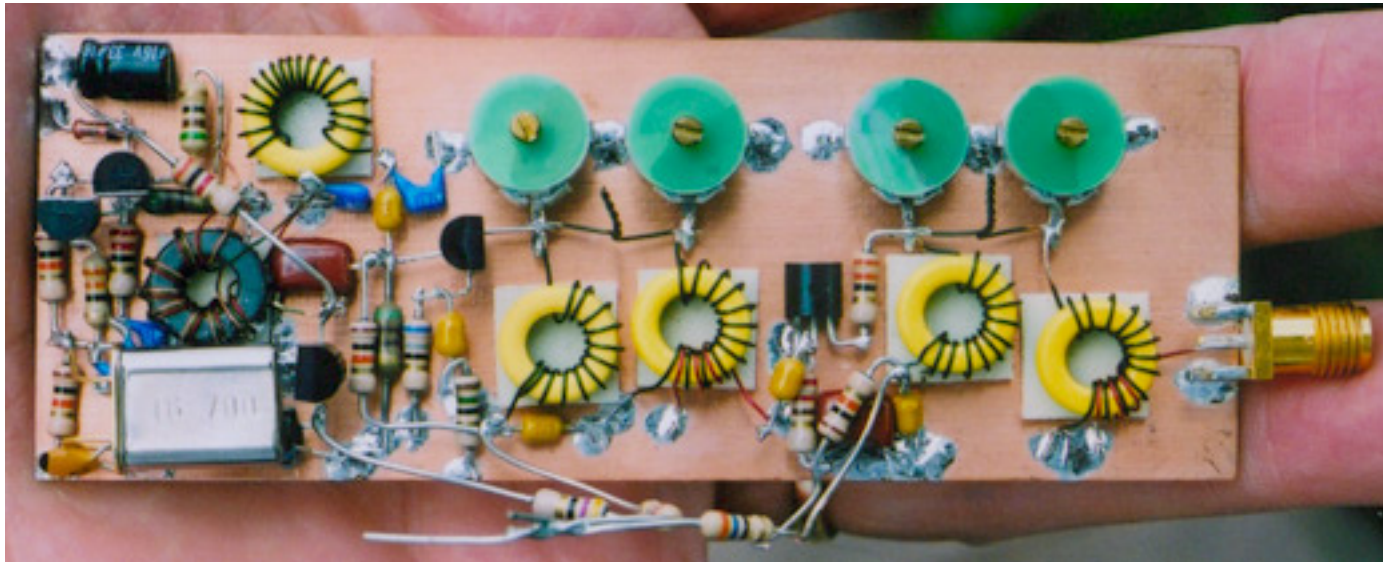
6m signal source

2m signal source

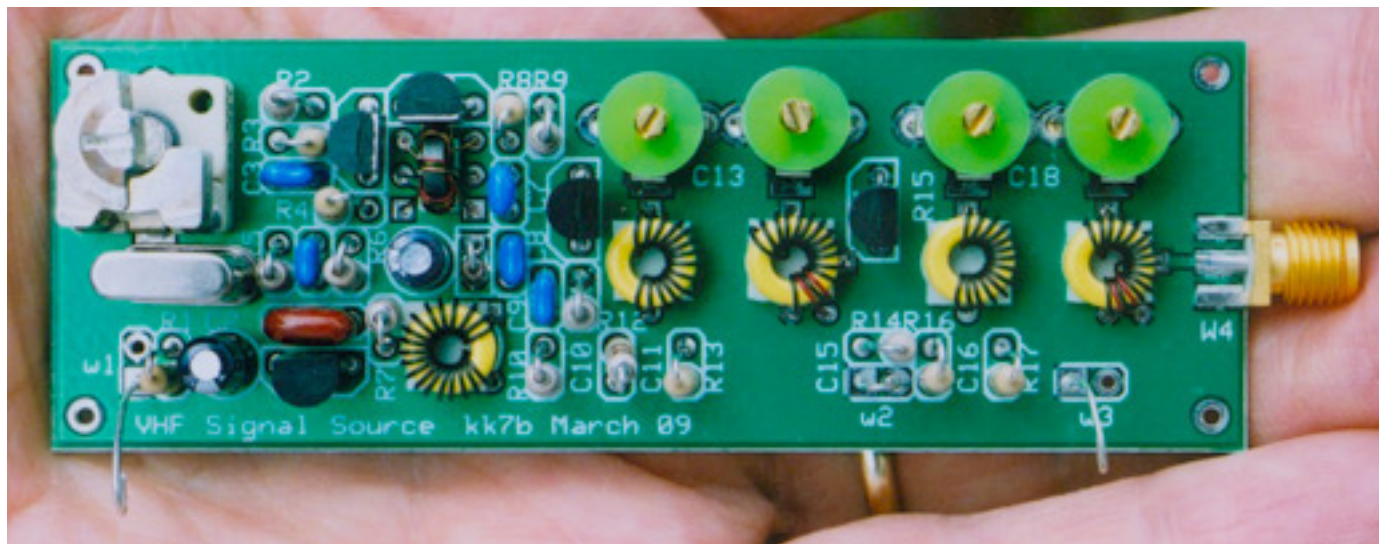


6m converter

2m converter



experimental prototype



Kanga US kit

Some experiments are easy and fun: fix an old radio and see how far you can work with it



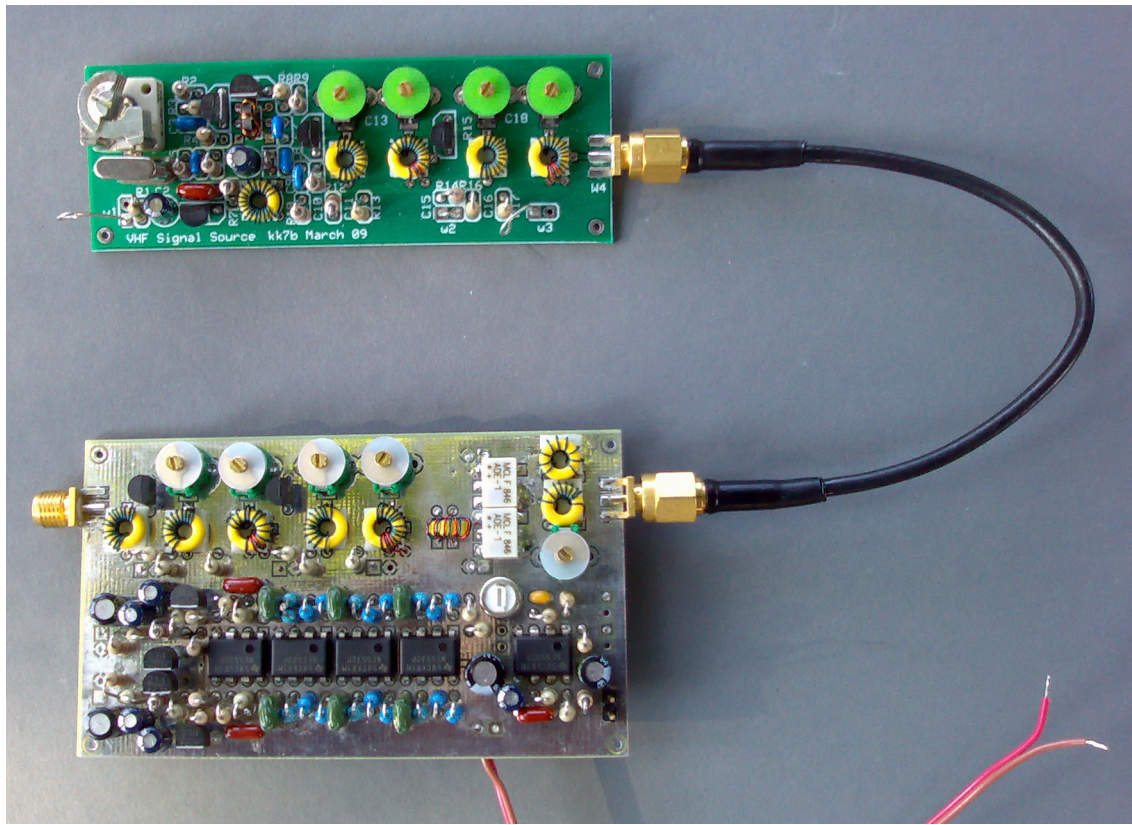
With this one, I compared FM and AM, using the same receiver and same IF filter bandwidth. AM is much more effective with weak signals. 29

An old
Gonset
will talk
to a
Yaesu
VX-7R or
FT-817
on 6m

6m wire
antennas
are fun to
play with

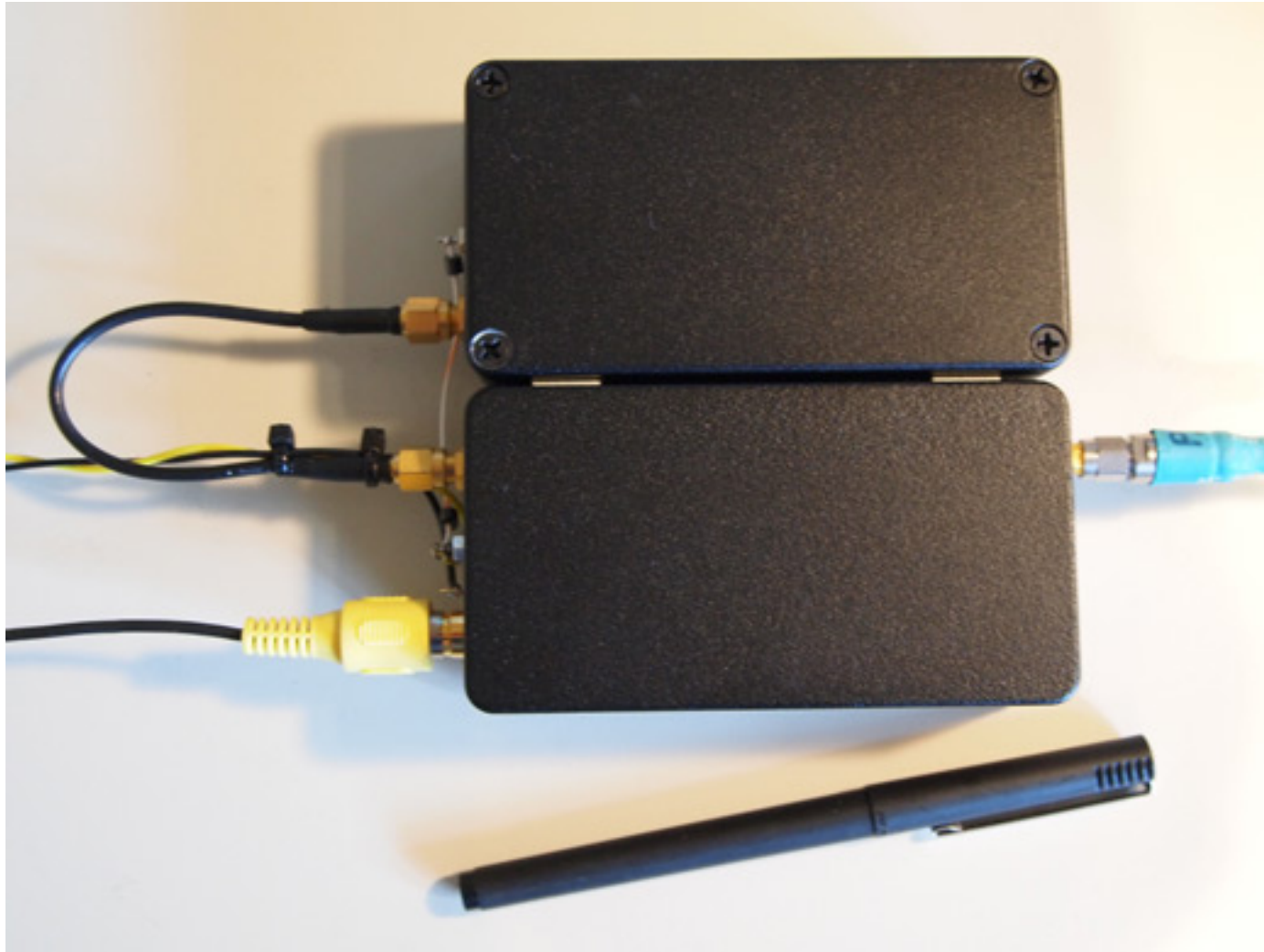


Lately I've been playing with a new VHF direct conversion receiver design.

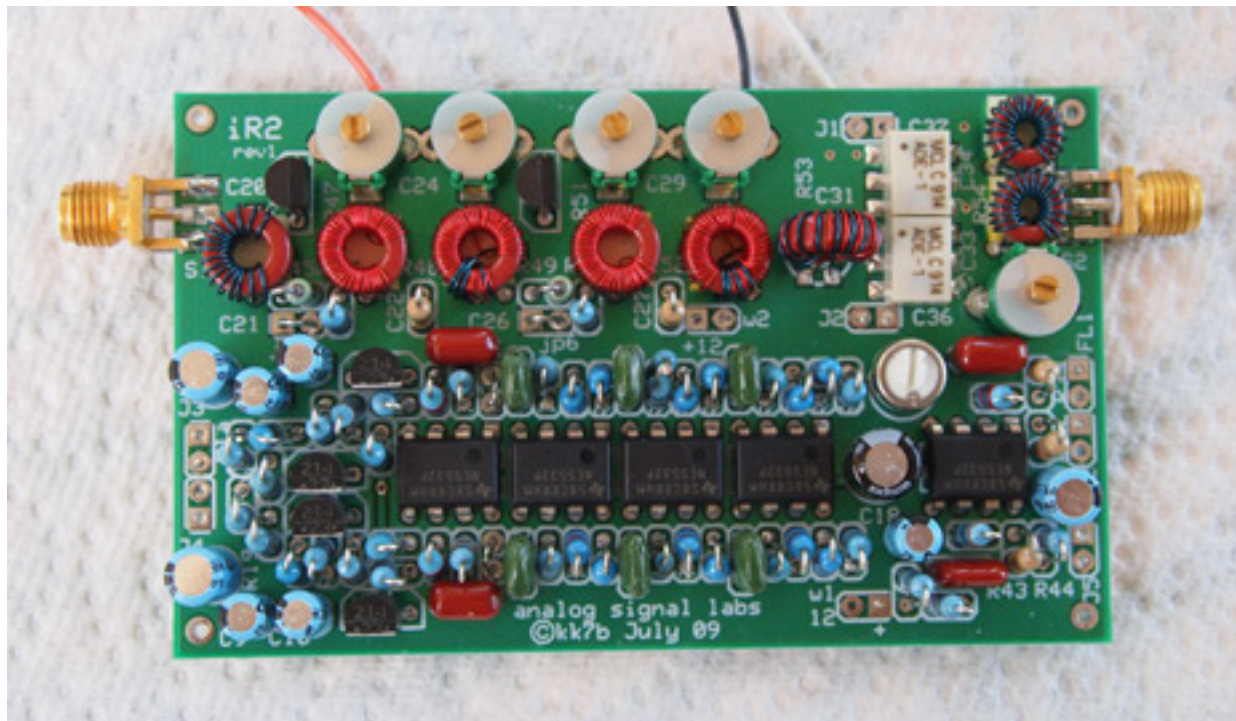


The VHF and iR2 receiver boards on the bench

The new VHF receiver all sealed up and listening continuously to a distant 6m beacon



Here's one of the new iR2 direct conversion receiver boards for the 30m band



Next Step: KK7B/mm



Or Maybe Vintage Marine Mobile...



Five Things to Do on VHF:

1. Hack your gear and put it on the air
2. Learn something
3. Teach something
4. Contribute to the community
5. Have fun

Resources:

Portland State University Dr. C web page:

<http://web.cecs.pdx.edu/~campbell/>

Kanga US web page:

<http://www.kangaus.com/>

Yahoo VHFkits group:

<http://groups.yahoo.com/group/vhfkits/>

ARRL, CQ and RSGB VHF publications