

Transverters and Narrowband Operation



Why Narrowband

- Receiver noise is proportional to bandwidth
 - 200 KHz WBFM to 2 KHz SSB = 20 dB
- Switch between transmit and receive
 - Higher TX power
 - Low-noise RX amplifier
- Equipment improvements
 - Stability
 - Better antenna
- ***More DX***

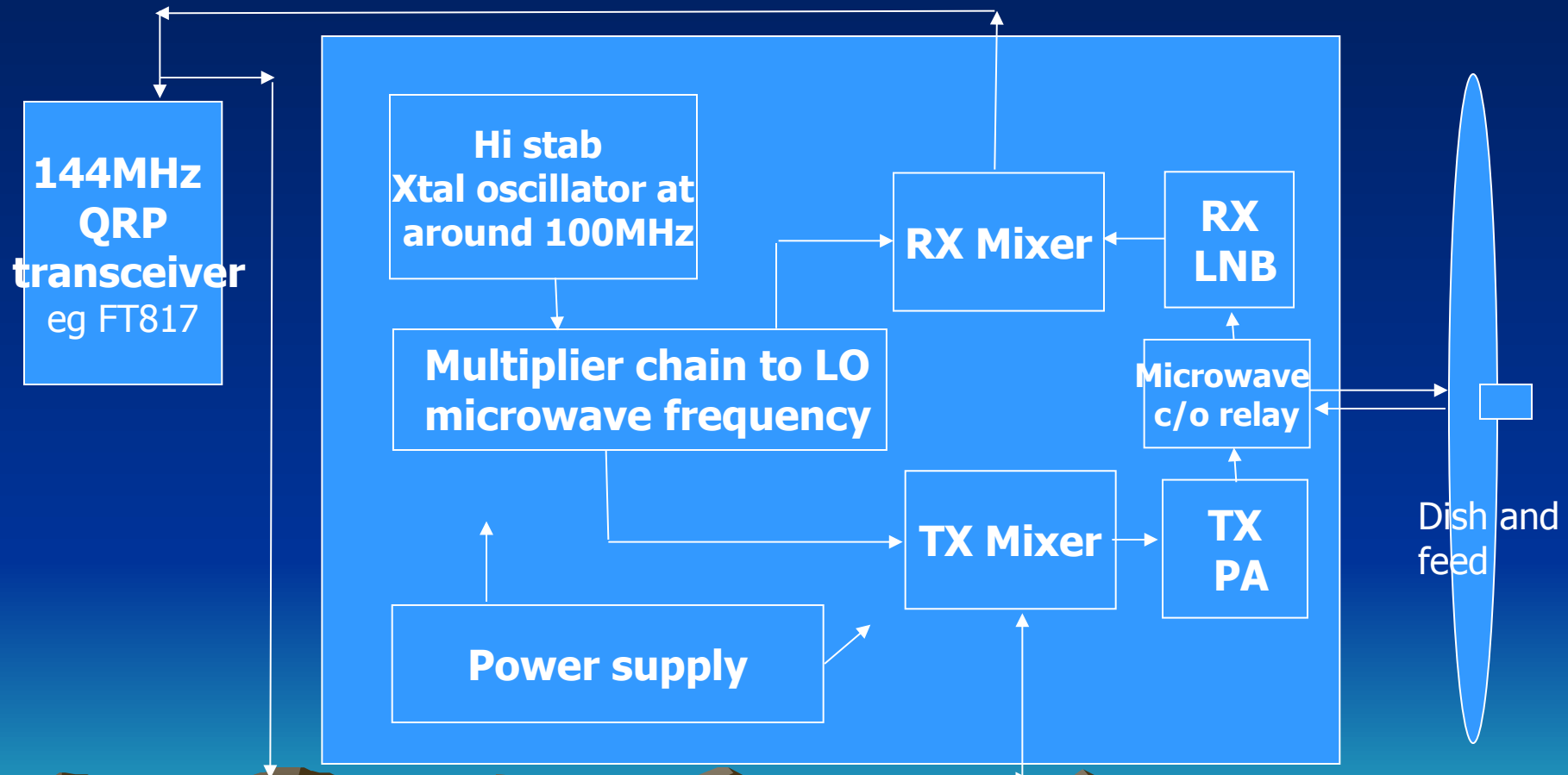


Transverter

- Converts signal from good transceiver to microwave frequencies
 - Transmit and Receive
- SSB stability required – stable oscillator



A modern narrowband microwave system



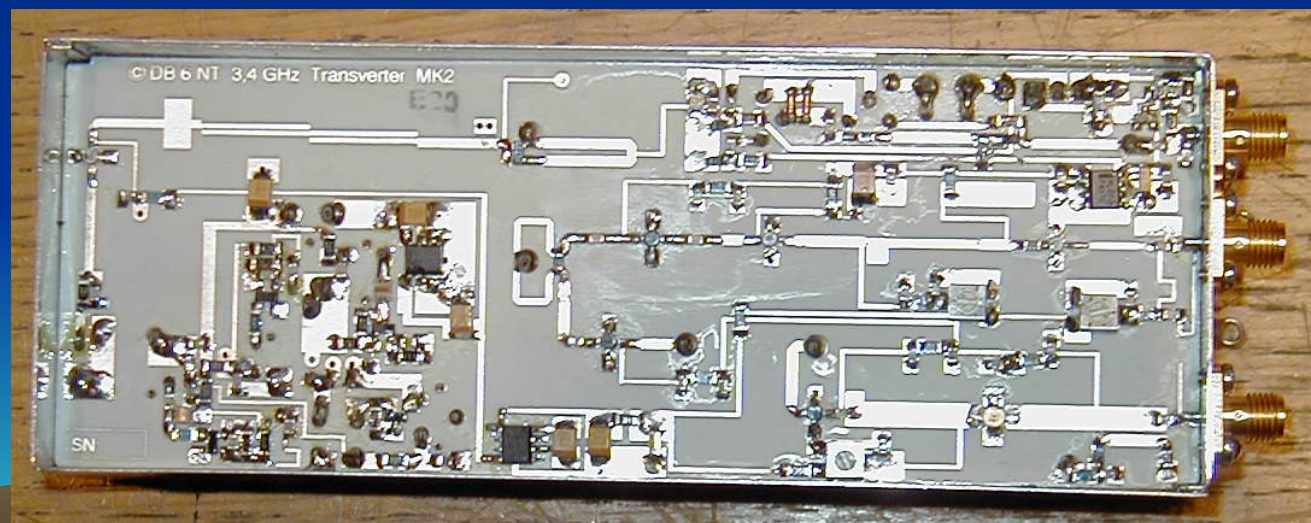
Today Michael Kuhne DB6NT rules!

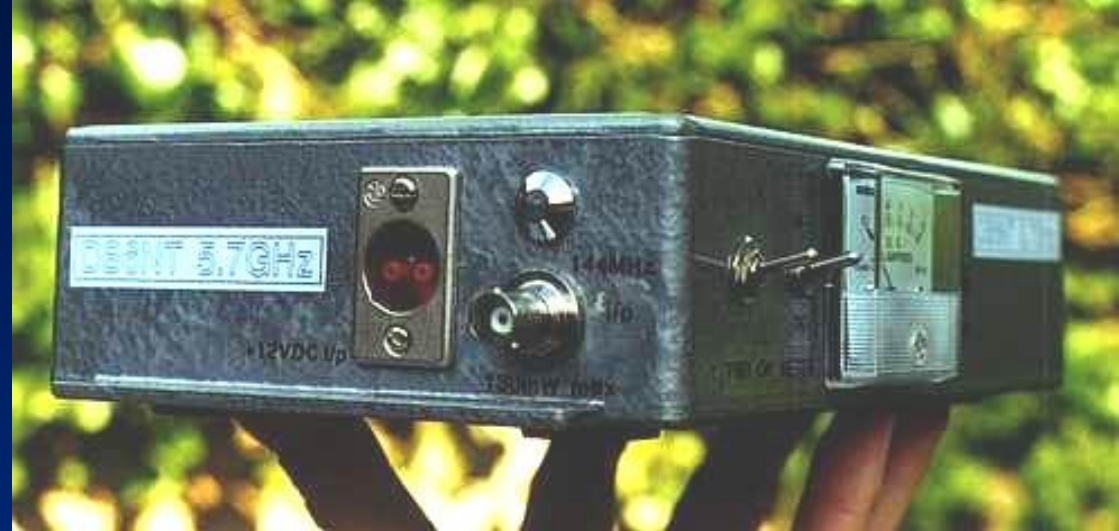


DB6NT NARROWBAND TRANSVERTER

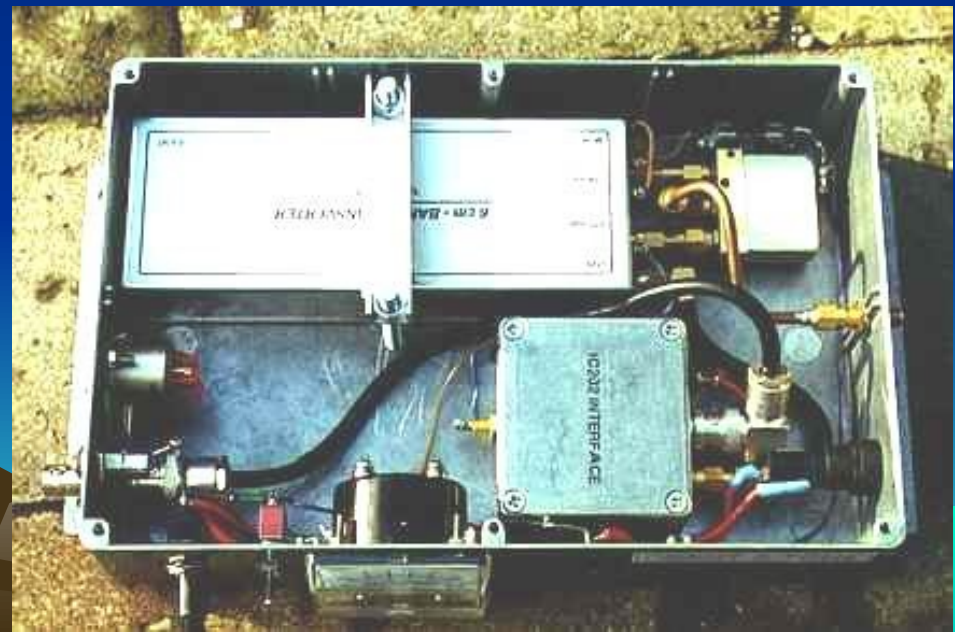
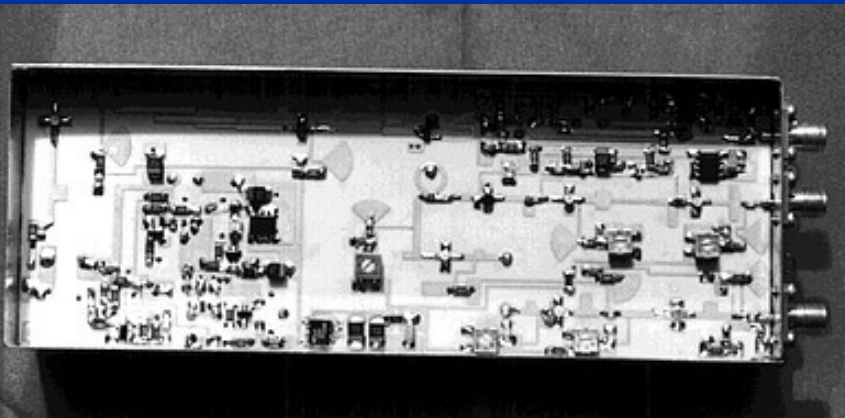
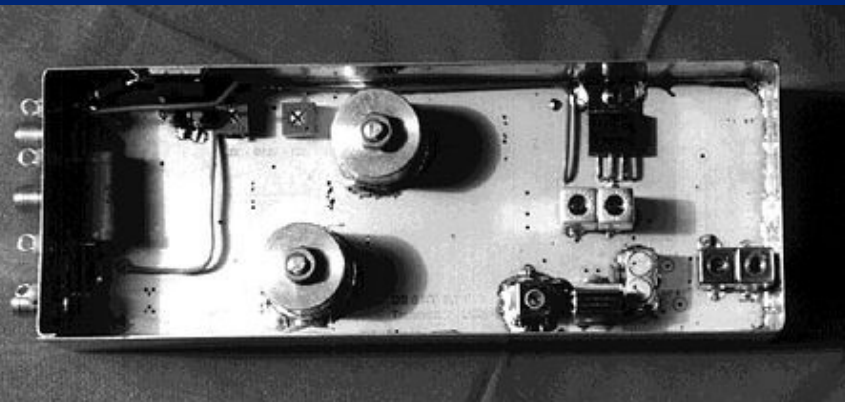


Available in
kitset or built up
form for all
microwave
bands from
1296MHz up





Narrowband in the 21st Century:
the DB6NT transverter route
... reliable and state of the art

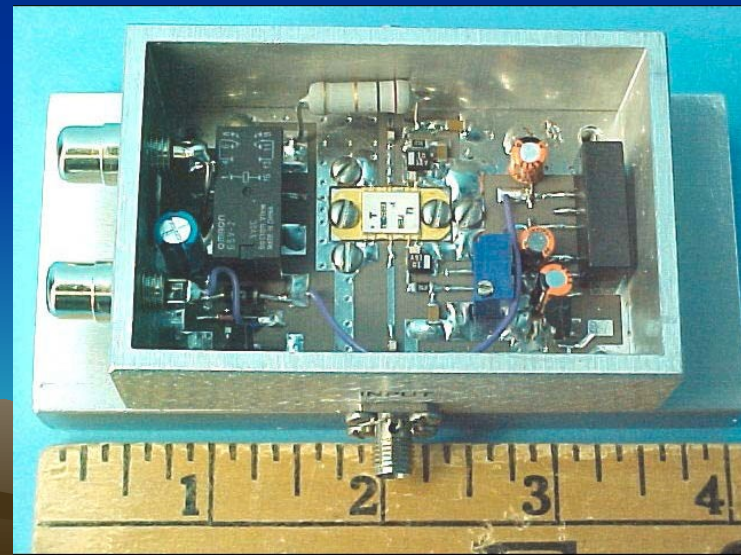
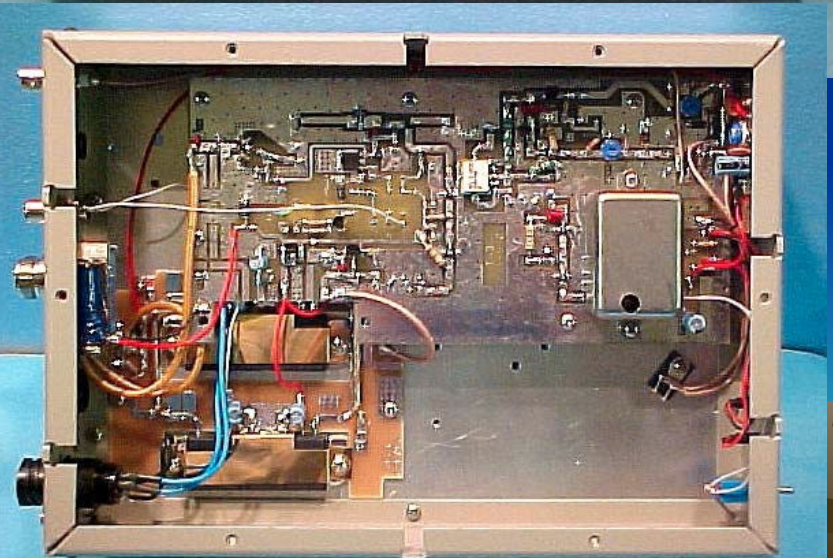


But it takes a lot of Euros

- Alternatives
 - Down East Microwave
 - Homebrew
 - Surplus
 - Borrow a rig and try it out first



DOWN EAST MICRO — — WAVE



MICROWAVE COMPONENTS



Some modern (and not so modern!) microwave components ...



A modern GaAsFET in a pack of ten

Gunn diode 1980's vintage



"bog standard" transistor



A strip of chip capacitors



A strip of modern surface mount bipolar transistors



Microwaving in the 21st Century offers a lot to anyone who likes home construction

- New skills have to be acquired ... such as soldering very small components to pcb boards and aligning homemade transceivers
- Easily available kits, especially from DB6NT in Germany and G3WDG in the UK
- Ready made modules are available for those who are scared of making a mess of their own!
- Surplus components and modules



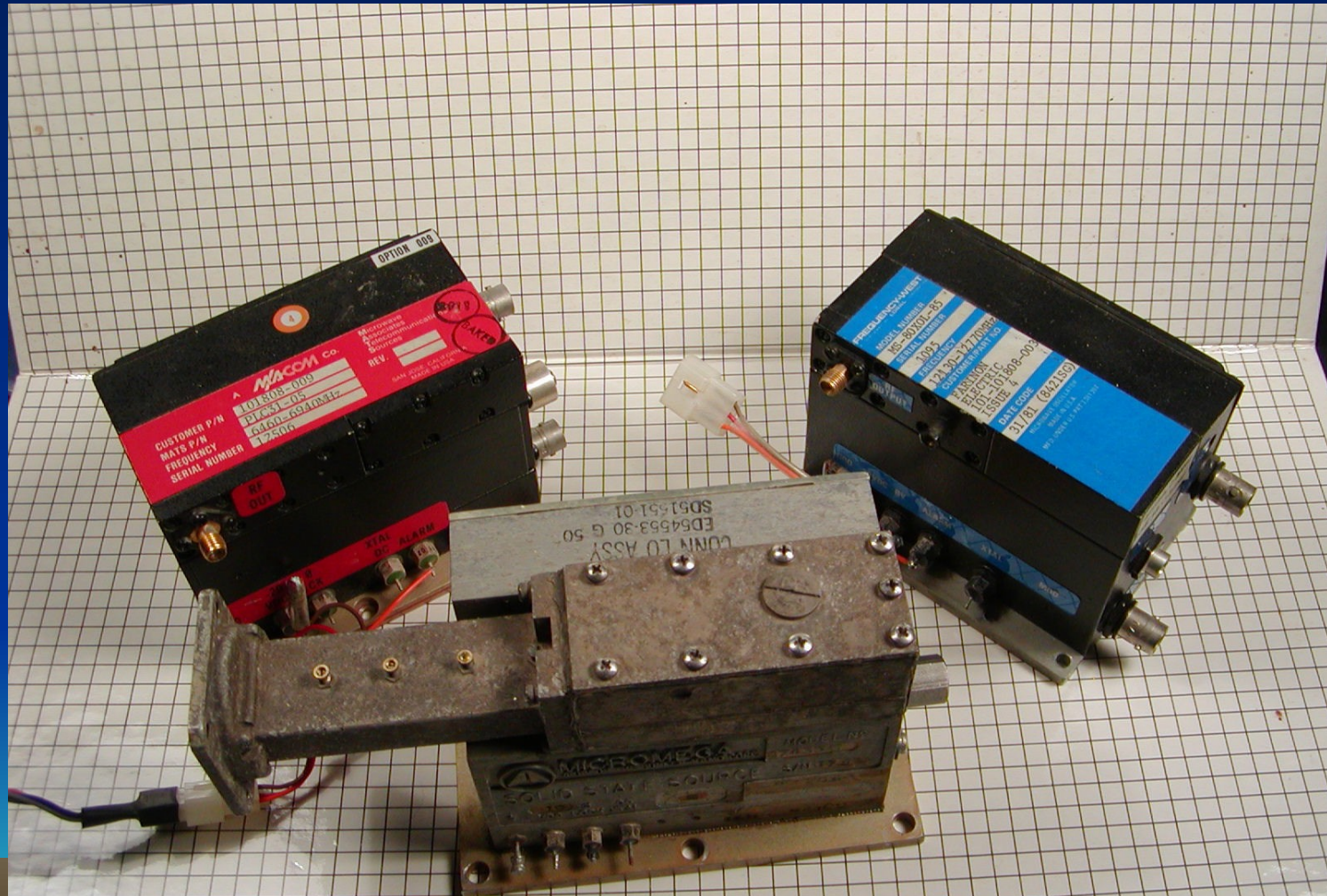


It helps if you have a well stocked "junk box"

Microwavers soon become avid collectors of spares!



Phase-locked Oscillators (bricks)

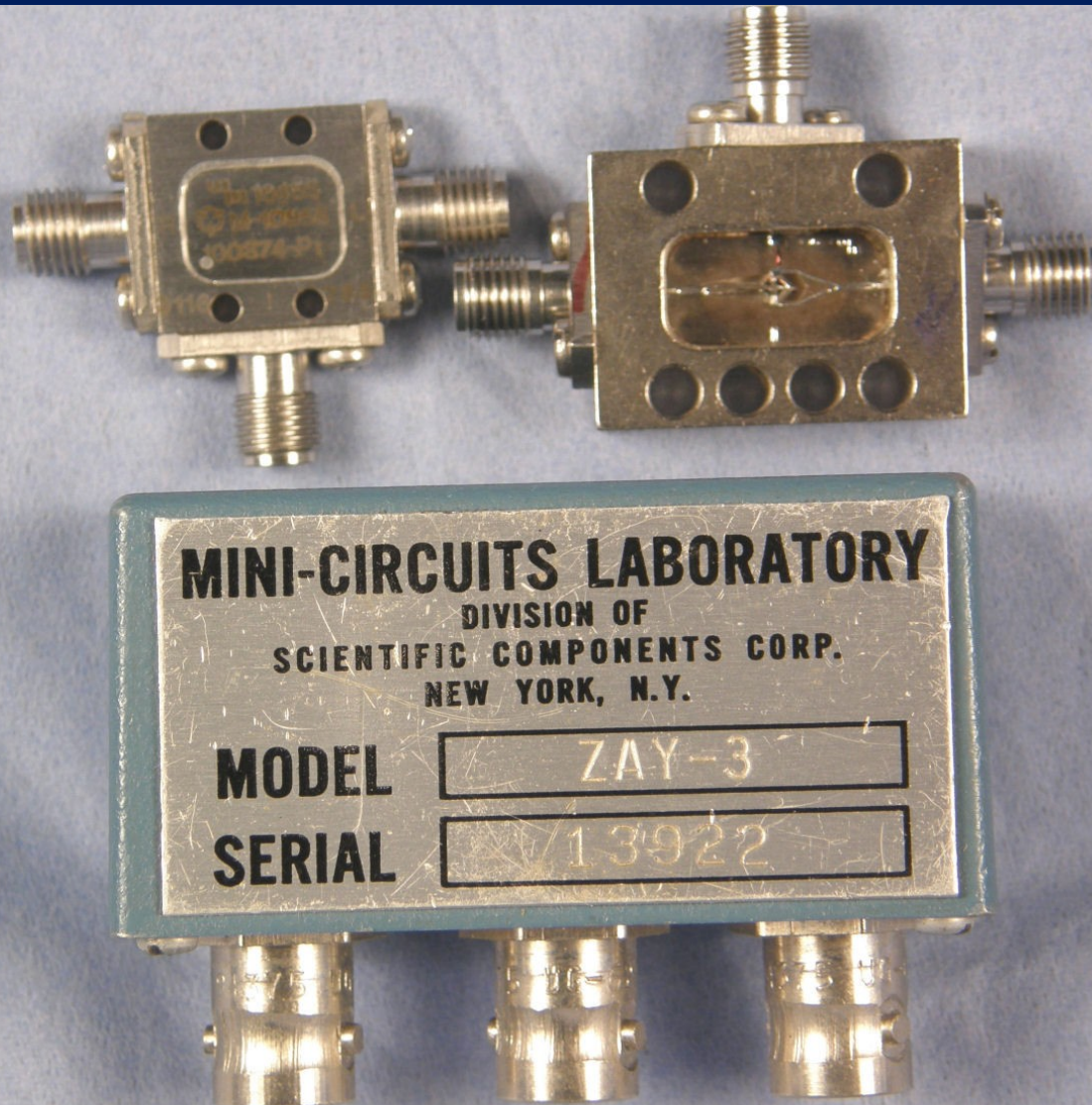


Mixer, Filter and IF Frequency

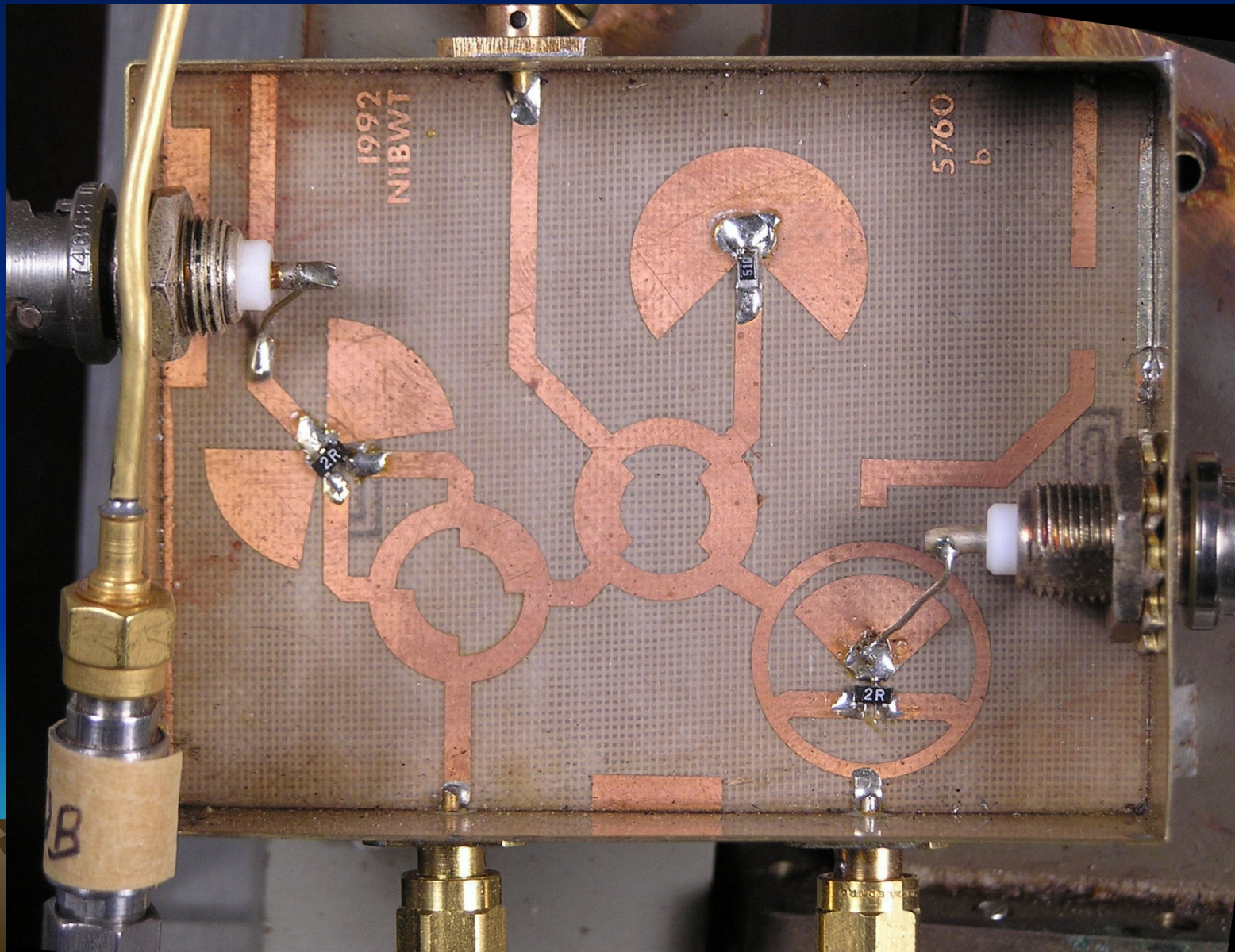
- Mixer outputs are $LO + IF$ *and* $LO - IF$
 - Half TX power in each
 - Twice as much RX noise
- Filter eliminates one
- High IF frequency makes filtering easier
 - 144 or 432 MHz readily available



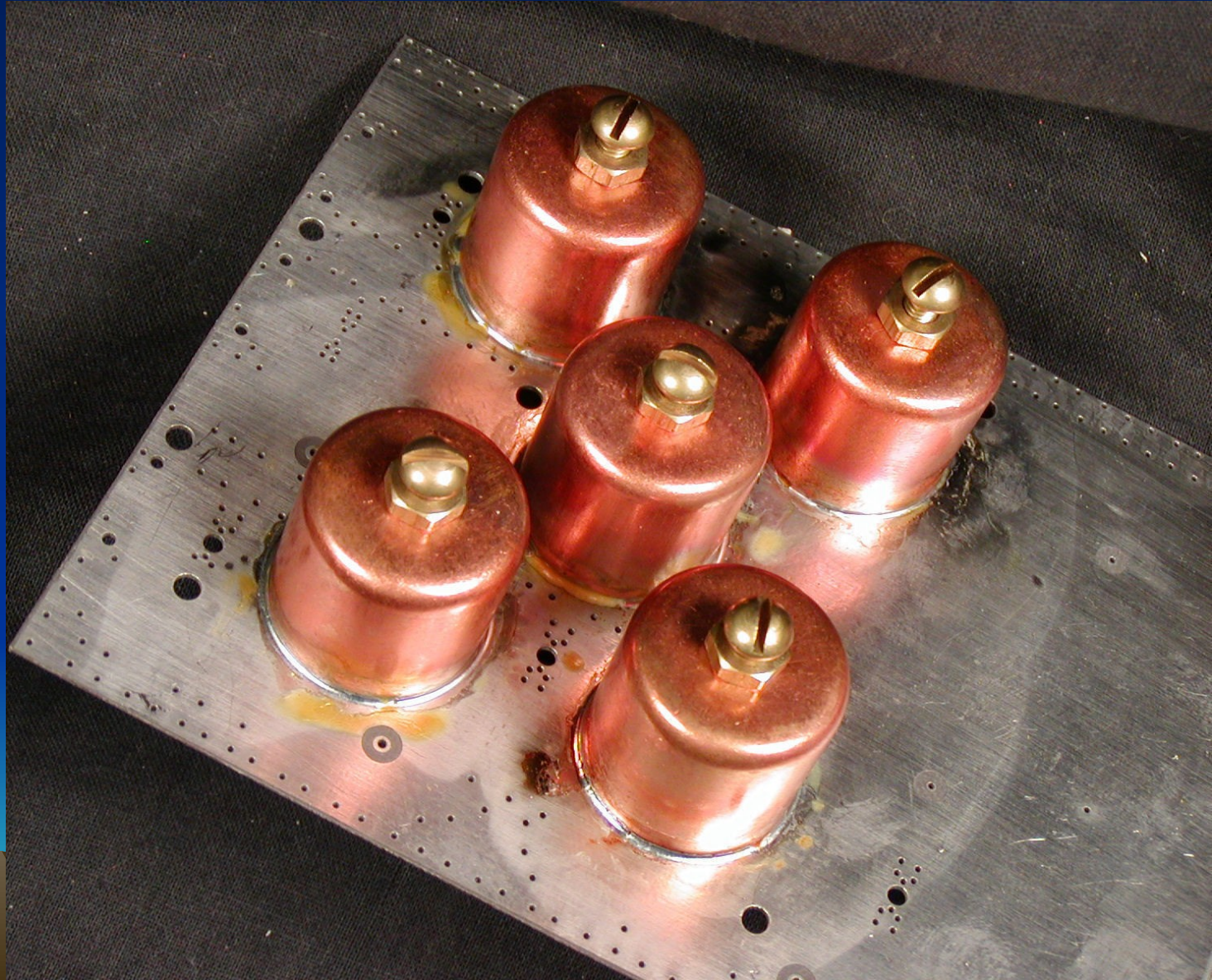
Mixers - Surplus



Mixers - Homebrew



Pipe-Cap Filters

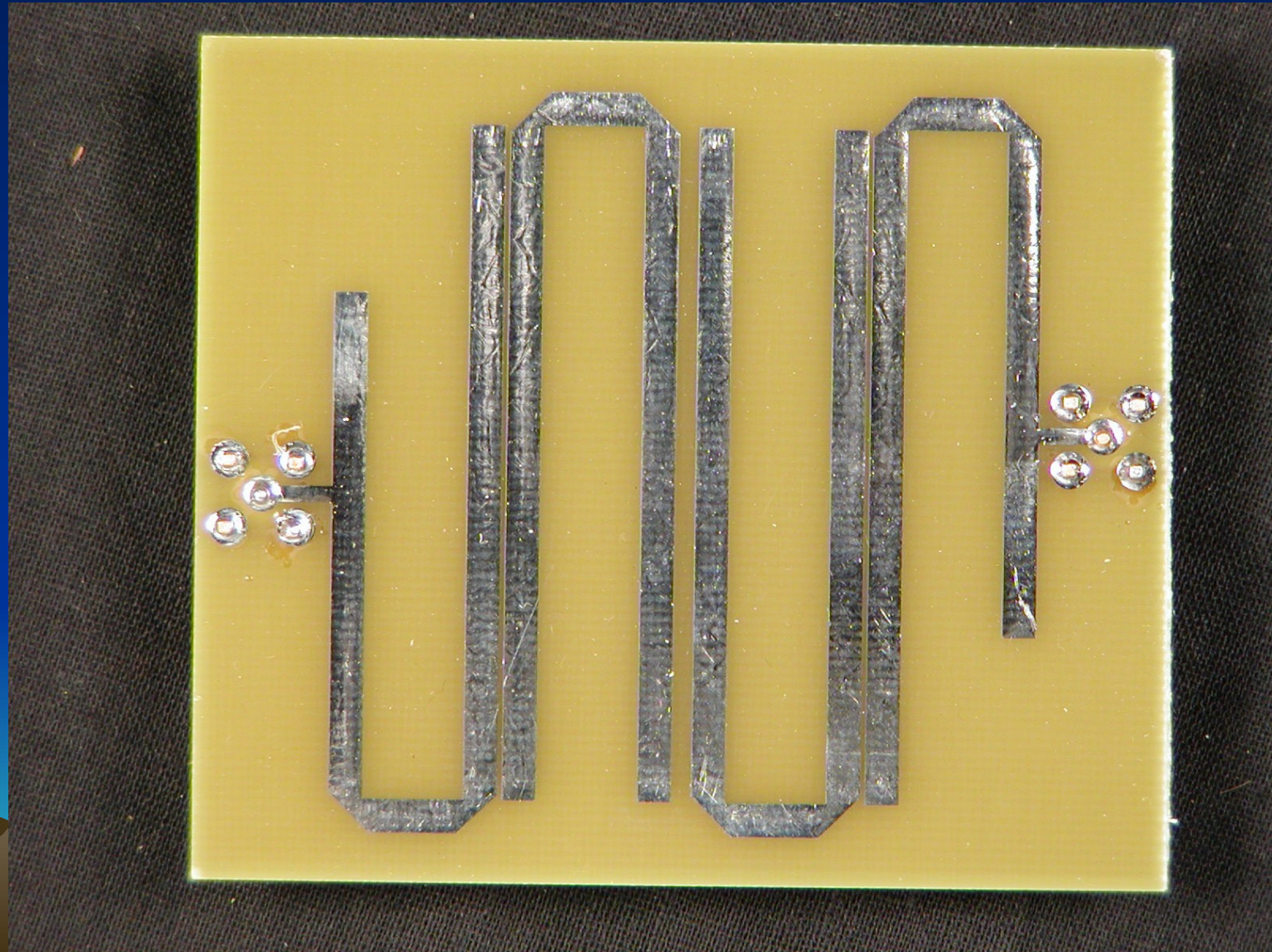


Waveguide Filter

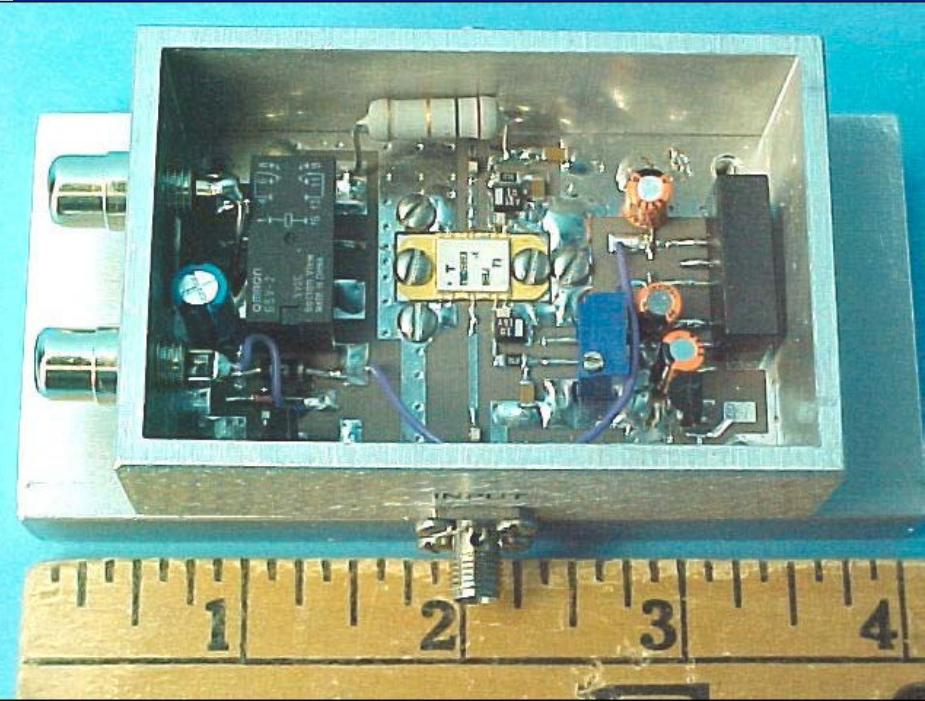


W2PED

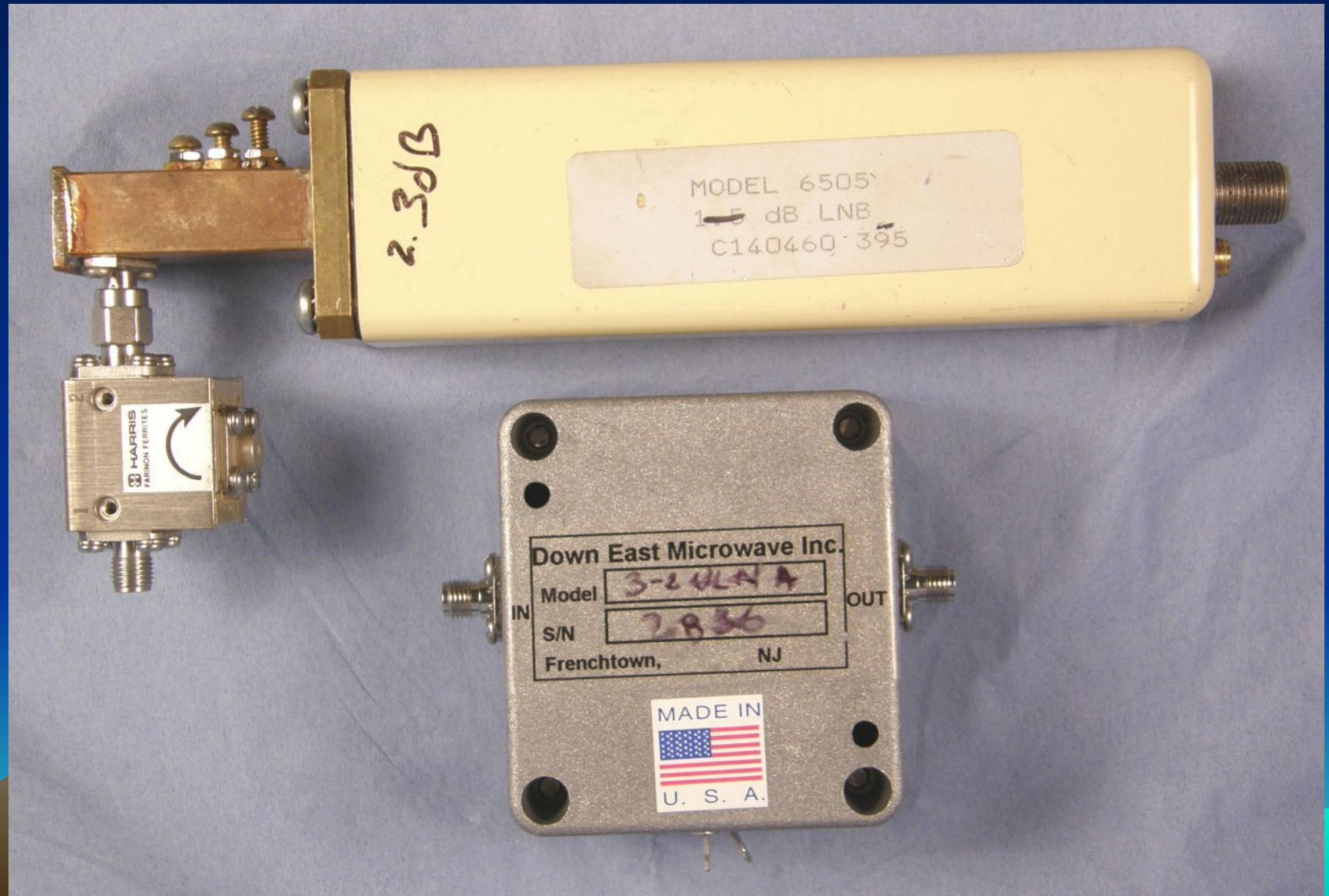
Printed-circuit Filter



Power Amplifiers

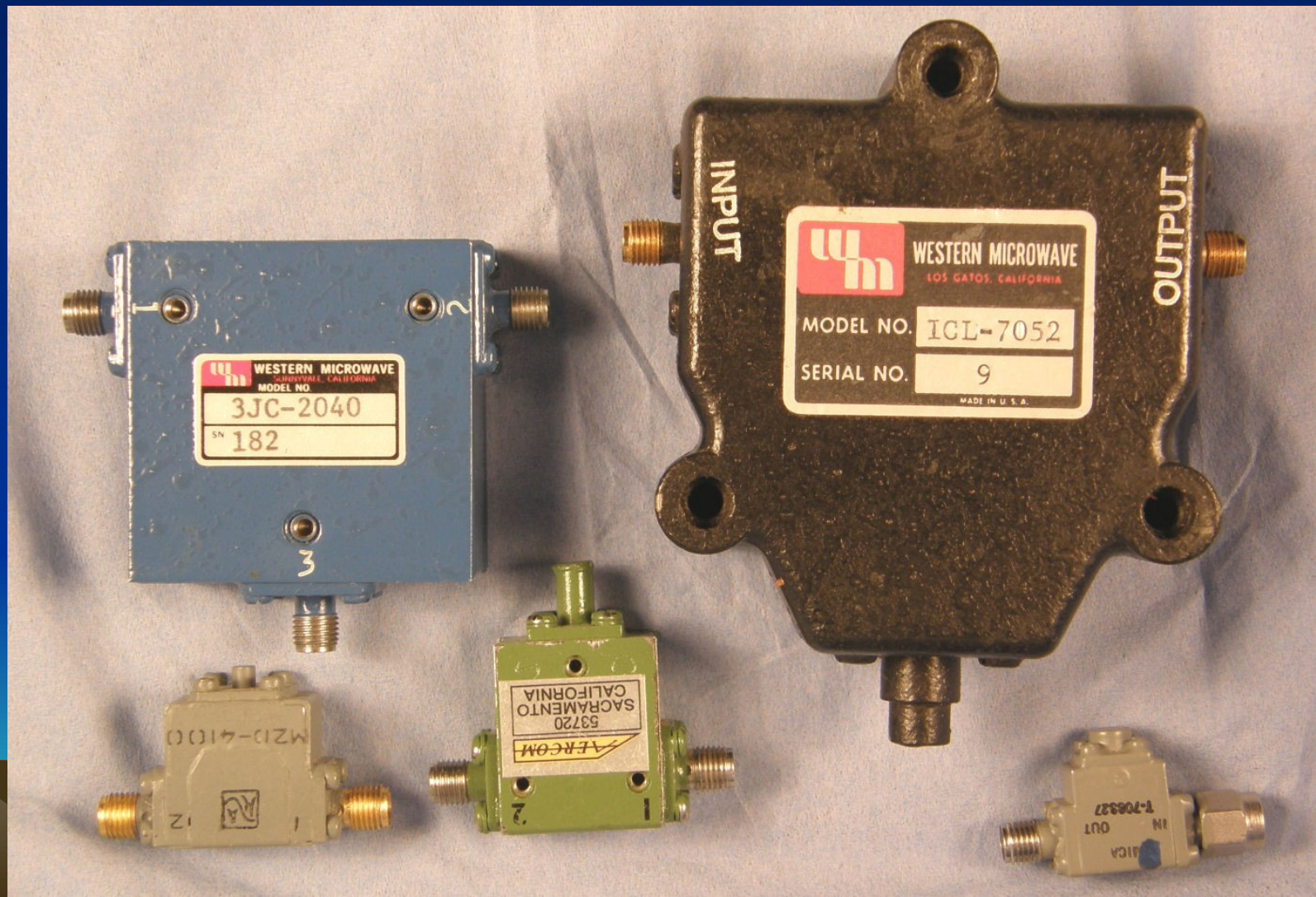


Low-noise RX amplifier

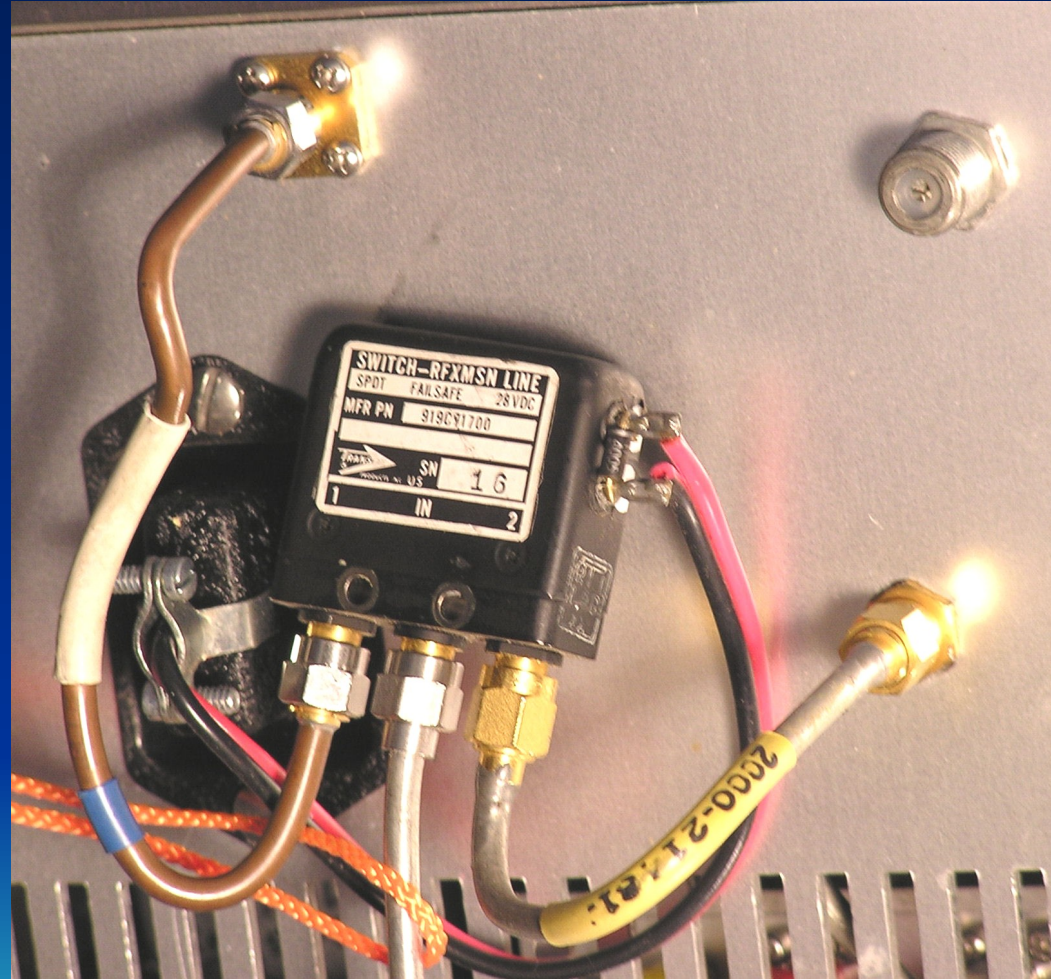
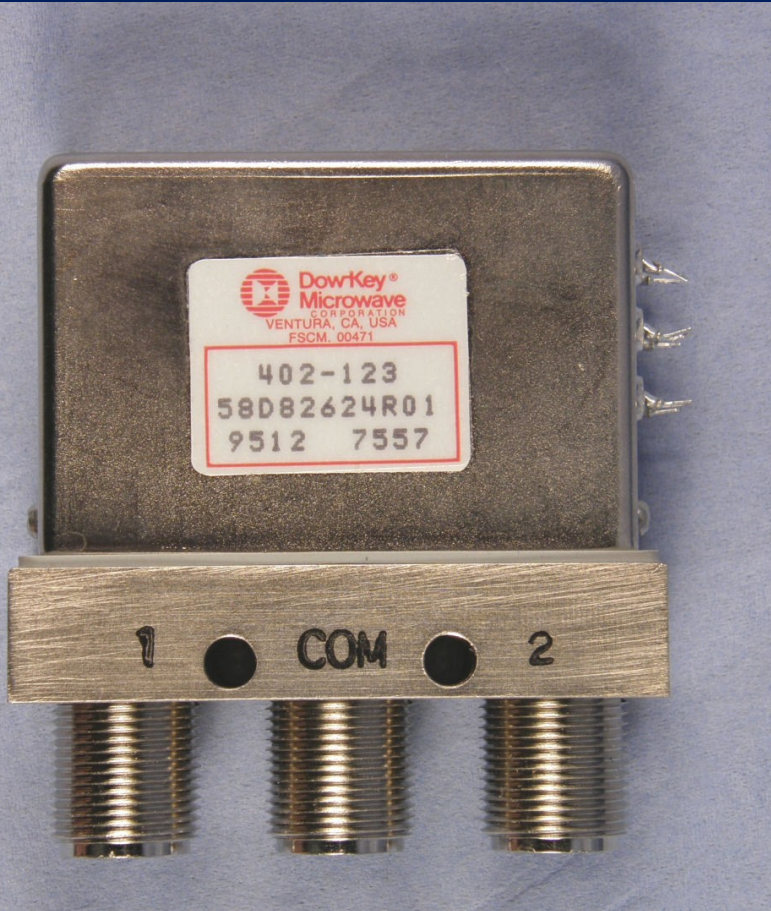


Isolators

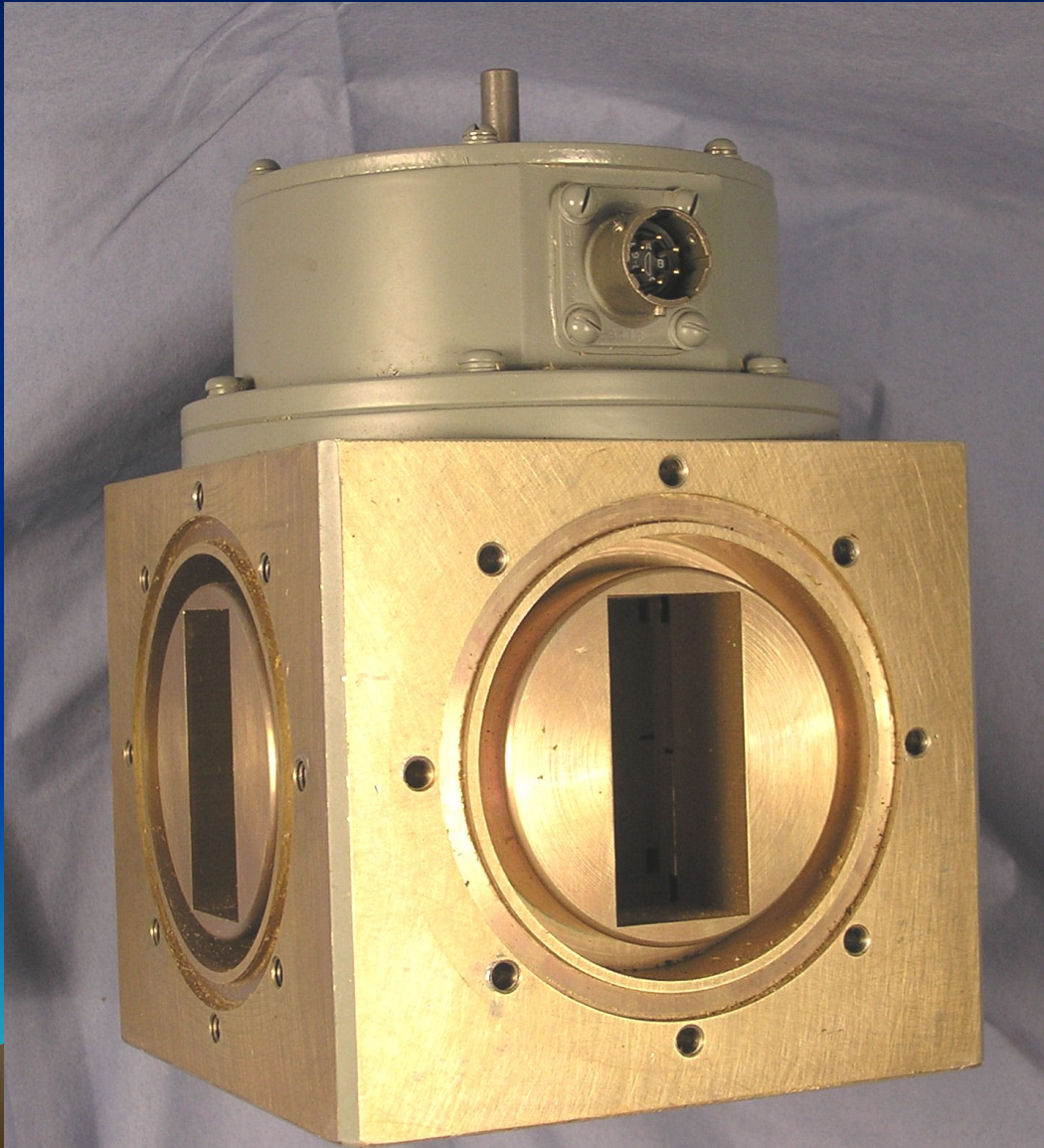
(protect the power amplifier)



TR Switch – coax



TR switch - waveguide



Sequencer



DC is important too



Anderson
PowerPoles

Waveguide

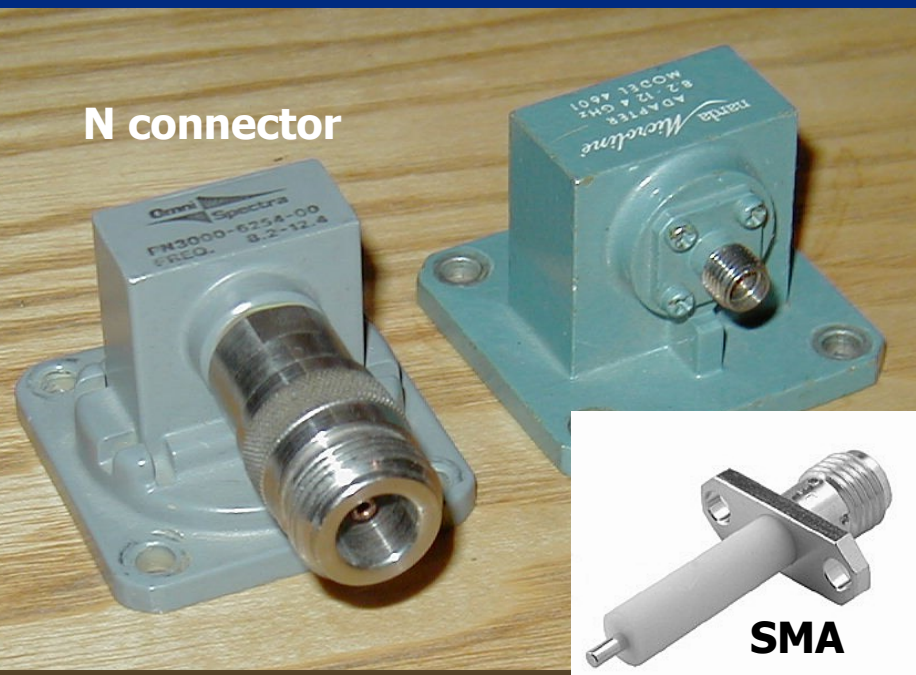


Andrew FSJ 1-50 Heliax



Semi rigid coax

N connector

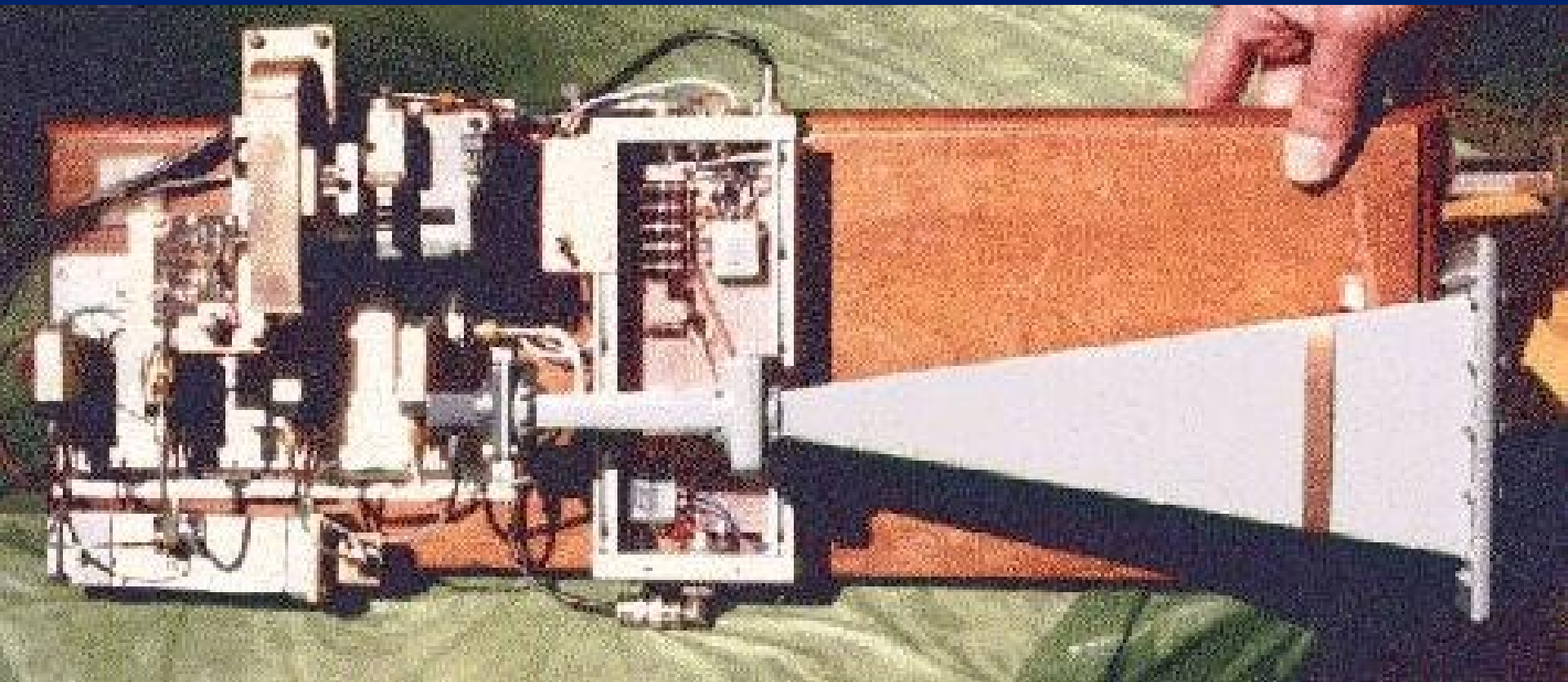


SMA

Feedlines at microwaves vary from waveguide (top left) which gets smaller in cross section the higher in frequency you go, to semi rigid and Heliax coax lines (top right).

Connectors are critical! The SMA connector shown in the inset photo to the lower left is the best available to amateurs. The N-type connectors shown are also very useful to 10GHz. Most other common types (eg PL259) are USELESS!

Transverter – AA1A

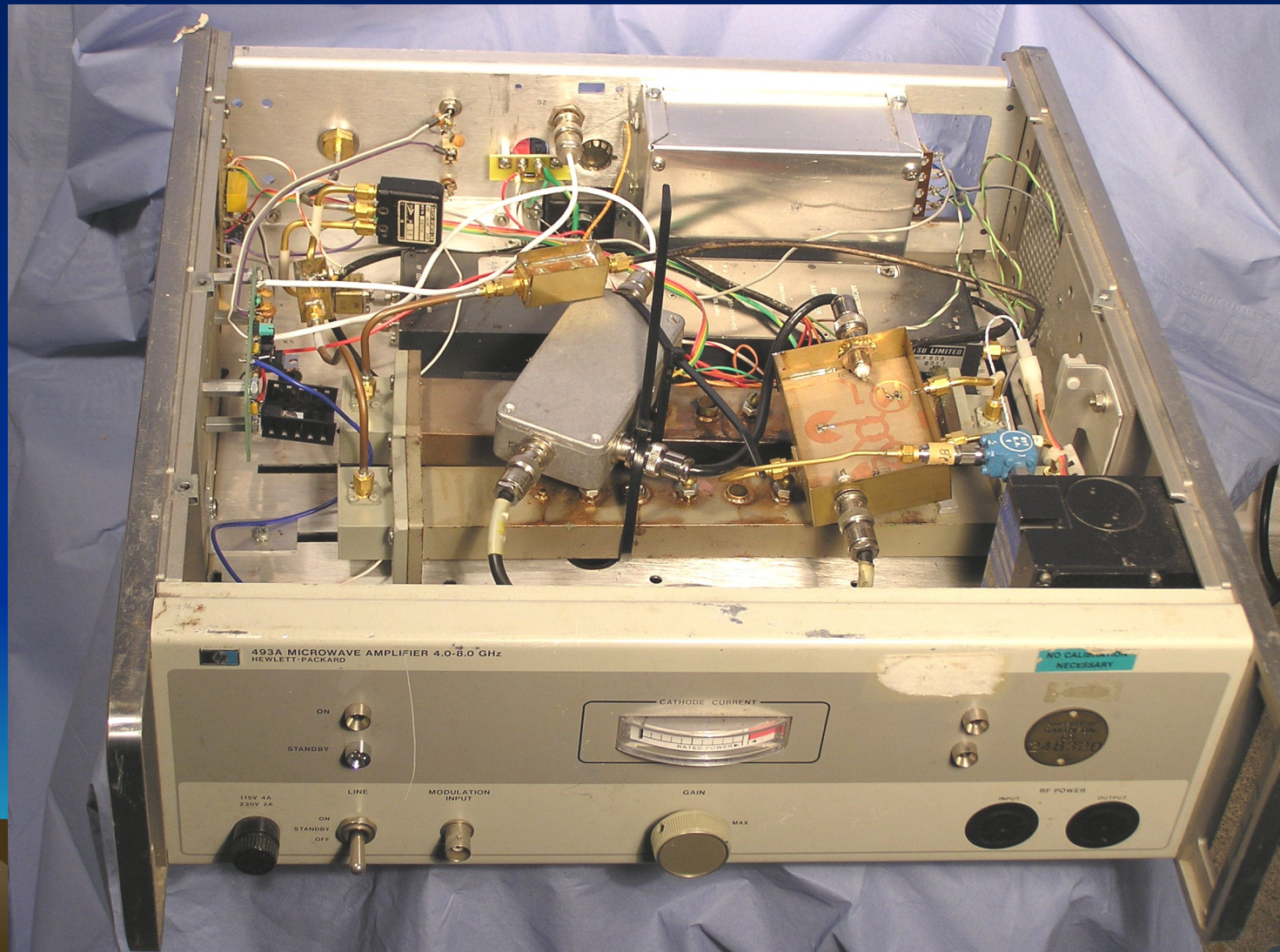


Packaging

- Fancy boxes are expensive
- Water protection is good
- Big enough to hold everything
- Room for changes and repairs
- *Don't choose the box first!*



Transverter from surplus components (including box)



Transverter with dish attached



Dish with
transverter
attached



KH6WZ – no rain protection



WB6CWN – handheld 10 GHz





Dish Envy



Your Transverter

- Whether you build or buy, you will have to do some packaging and assembly.
- Every one is different
- No Yaesu, Icom or Kenwood
- *You can do it, and be proud of it!*

