



HAM RADIO

IT'S AN ADVENTURE.....

YOU GOT YOUR TICKET – WHAT TO DO NOW????

- My first radio was a FT470 HT – big, heavy but darn near indestructible – still works today – all the accessories are broken –not very convenient now
- 5 years later - My HF station was quite modest – a 20m wire antenna with the FT840 transceiver – present from my father in law – I did not understand what “HF” is....



I NEED SOMETHING MORE – A KIT BUILD?

- 3 years later - decided to experiment with antenna building – how hard can that be?
- Obtained a balun, wire, rope, eye hooks, coaxial cable and connectors
- Assembled the antenna and hooked it all up
 - It didn't work (&#x24;*^)
- There are resources on the web to help guide one - <http://www.eham.net/> but the story has a twist



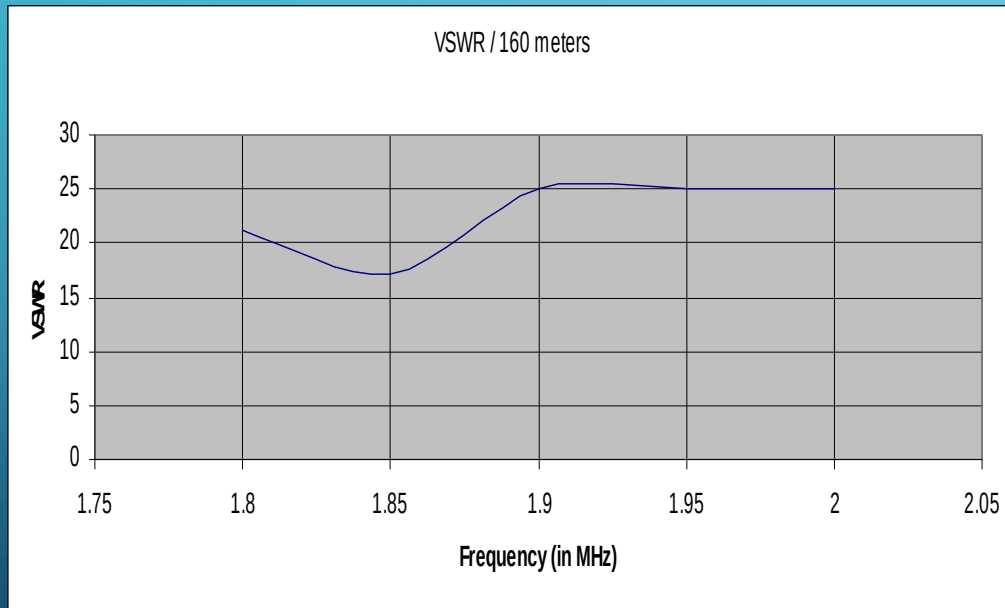
WHERE DID I GO WRONG?

- I talked to a fellow ham in the neighborhood and being the good Elmer that he is, he loaned me his antenna analyzer
- I found out I had a factor of 2 error in all my calculations -Ouch...
- I now had lots of extra wire so why not put it to good use
- FAN dipole.... 80m, 40m, 20m, 10m in one antenna
- Low VSWR on all bands as well as 6m
- Low visual footprint - no upset neighbors

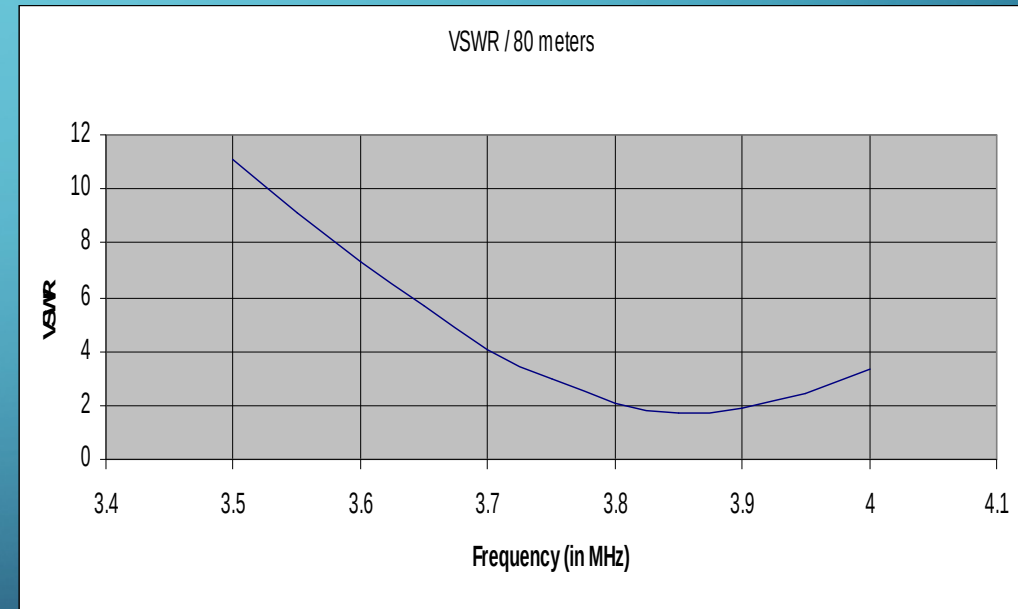


NOW IT WORKS! (BUT NOT ON ALL BANDS)

- 160 METERS VSWR

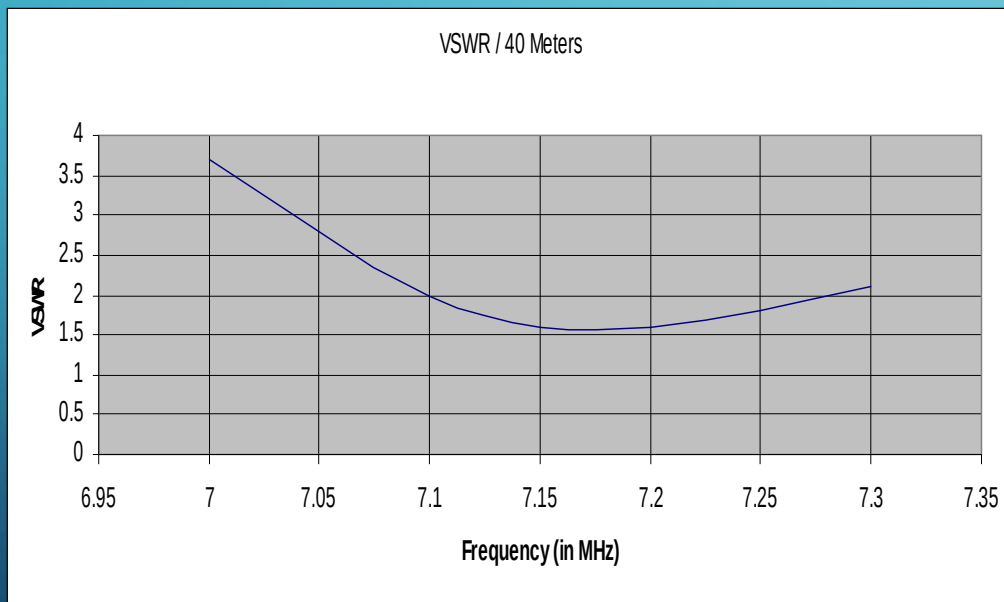


- 80 METERS VSWR

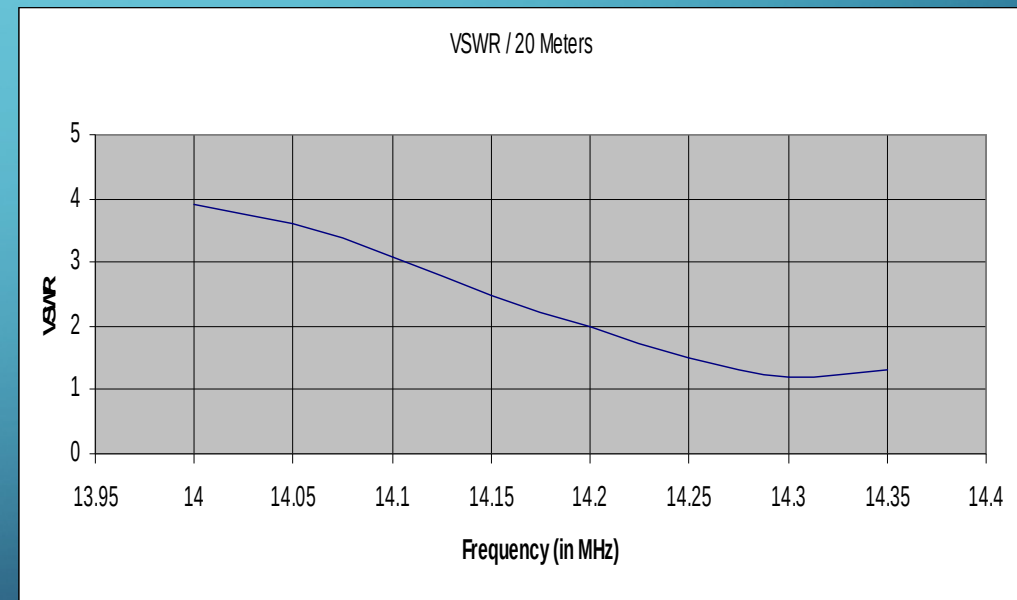


NOW IT WORKS! (BUT NOT ON ALL BANDS)

- 40 METERS VSWR

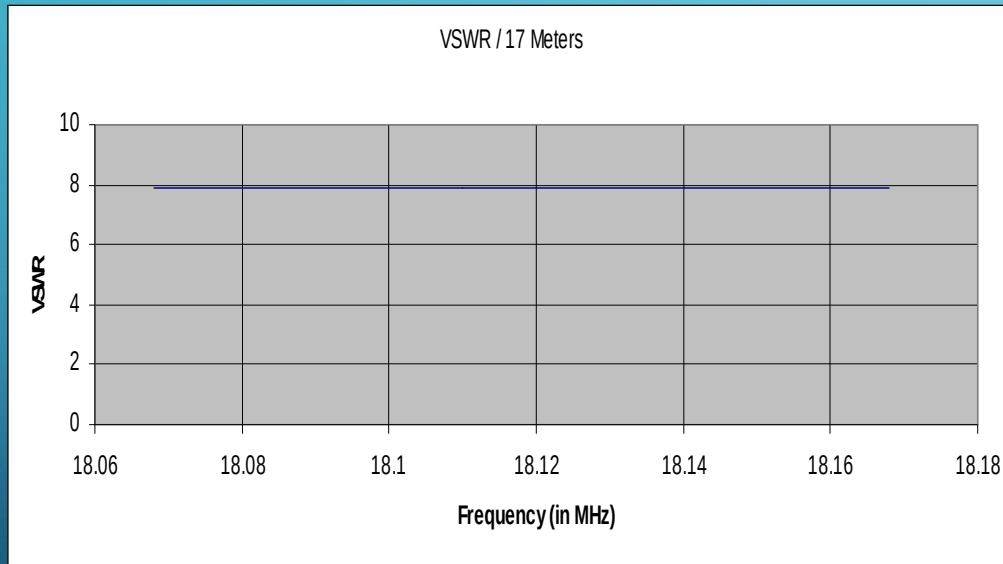


- 20 METERS VSWR

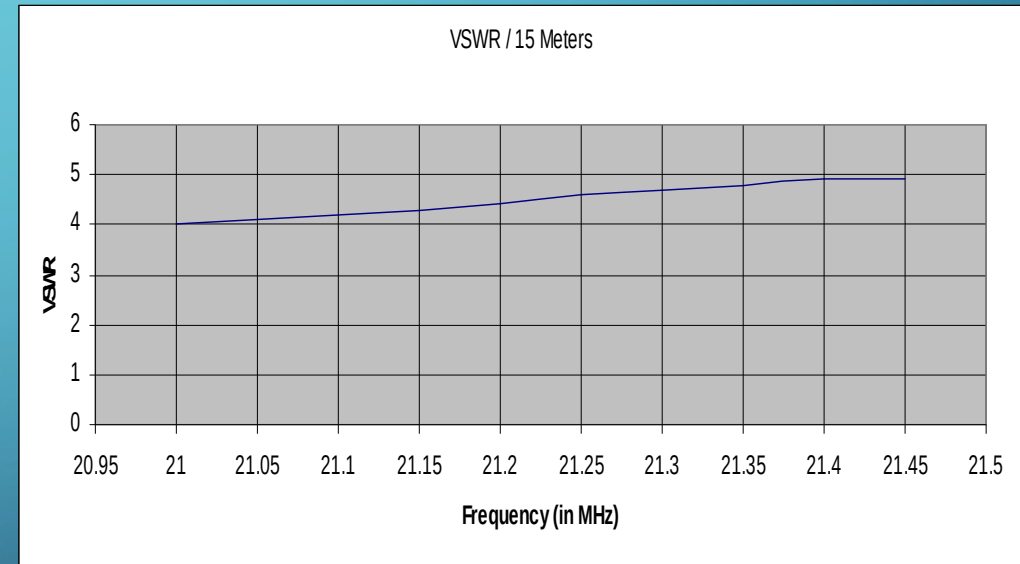


NOW IT WORKS! (BUT NOT ON ALL BANDS)

- 17 METERS VSWR

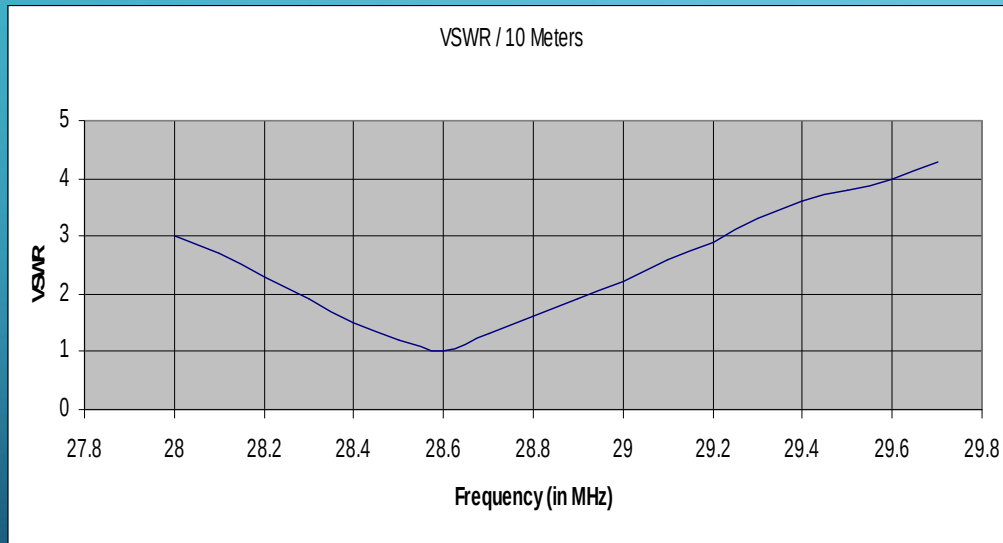


- 15 METERS VSWR

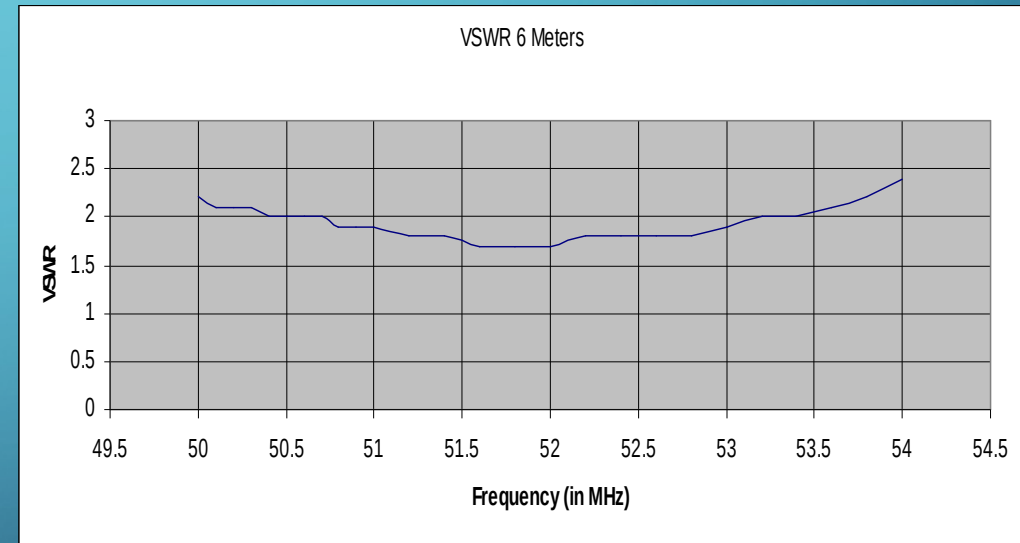


NOW IT WORKS! (BUT NOT ON ALL BANDS)

- 10 METERS VSWR



- 6 METERS VSWR



I CAN HEAR MOST EVERYTHING NOW!

- The HF rig is starting to drift around in frequency and is noisy with the new antenna – what can I do?
- I need a better receiver – how do I figure out what is “Good”?
- <http://www.sherweng.com/table.html>
- Ergonomics vs performance
- Operating Style
- Requirements vs eye candy
- Budget constraints

Device Under Test	Noise Floor (dBm)	AGC Thrshld (uV)	dB	100kHz Blocking (dB)	Sensitivity (uV)	LO Noise (dBc/Hz)	Spacing kHz	Front End Selectivity	Filter Ultimate (dB)	Dynamic Range Wide Space (dB)	kHz	Dynamic Range Narrow Space (dB)	kHz
Added 9/29/14													
FlexRadio Systems 6700	-118	3.0		130	2.0	145	10	B Band Pass	115	99	20&2	108 ^y	20&2
Hardware Updated	-135 ^{a2}	1.0 ^{a2}	Var	preamp Off	0.25 ^{a2}	155	50						
Added 11/10/15													
Elecraft K3S	-135	1.5	3	150	0.27	144	10	B Band Pass	110	107 ^q	20	106 ^p	2
	-138 ^b	0.45 ^b			0.08 ¹⁰	146	50					106 ^q	
Added 02/23/15													
Elecraft K3 (RX Gain Recal) New Synthesizer	-136	1.0	3	141	0.27	145	10	B Band Pass	108	105 ^q	20	107 ^p	2
	-139 ^{bq}	0.3 ^b			0.20 ^b	147	50					104 ^q	
Added 04/25/16													
Icom IC-7851	-123	8.5	3	149	0.65	148	10	A Trk Presel	100	110 ^{aa}	20	105 ^{aa}	2
	-135 ^b	1.85 ^b			0.16 ^b	153	50						
	-141 ^{b1}	1.16 ^b			0.11 ^{b1}								
Added 10/02/12													
Hilberling PT-8000A Hardware Rev 2.00	-128	5.4	3	142	0.45	144	10	A Trk Presel	100	105	20	105 ^w	2
	-141 ^b	1.0 ^b			0.11 ^b	149	50						
Added 08/10/12													
Elecraft KX3	-123	12	3	138	0.9	144	10	B Band Pass	110	105	20	104 ^t	2
	-138 ^{b2}	1.3 ^{b2}			0.09 ^{b2}							96 ^u	
												65 ^v	
Added 12/01/10													
Yaesu FTdx-5000D	-123	4.6	3	127 ^s	1.1	135	10	B Band Pass	90 ^f	104	20	101 ^f	2
	-135 ^b	1.2 ^b			0.27 ^b								
	-141 ^{b1}	0.33 ^{b1}			0.13 ^{b1}								
Added 2/15/08													
Elecraft K3	-130	2.1	3	140 ^s	0.33	138	10	B Band Pass	105	104	20	101 ^{pf}	2
	-138 ^b	0.6 ^b			0.19 ^b							96 ^{qf}	
												95 ^r	

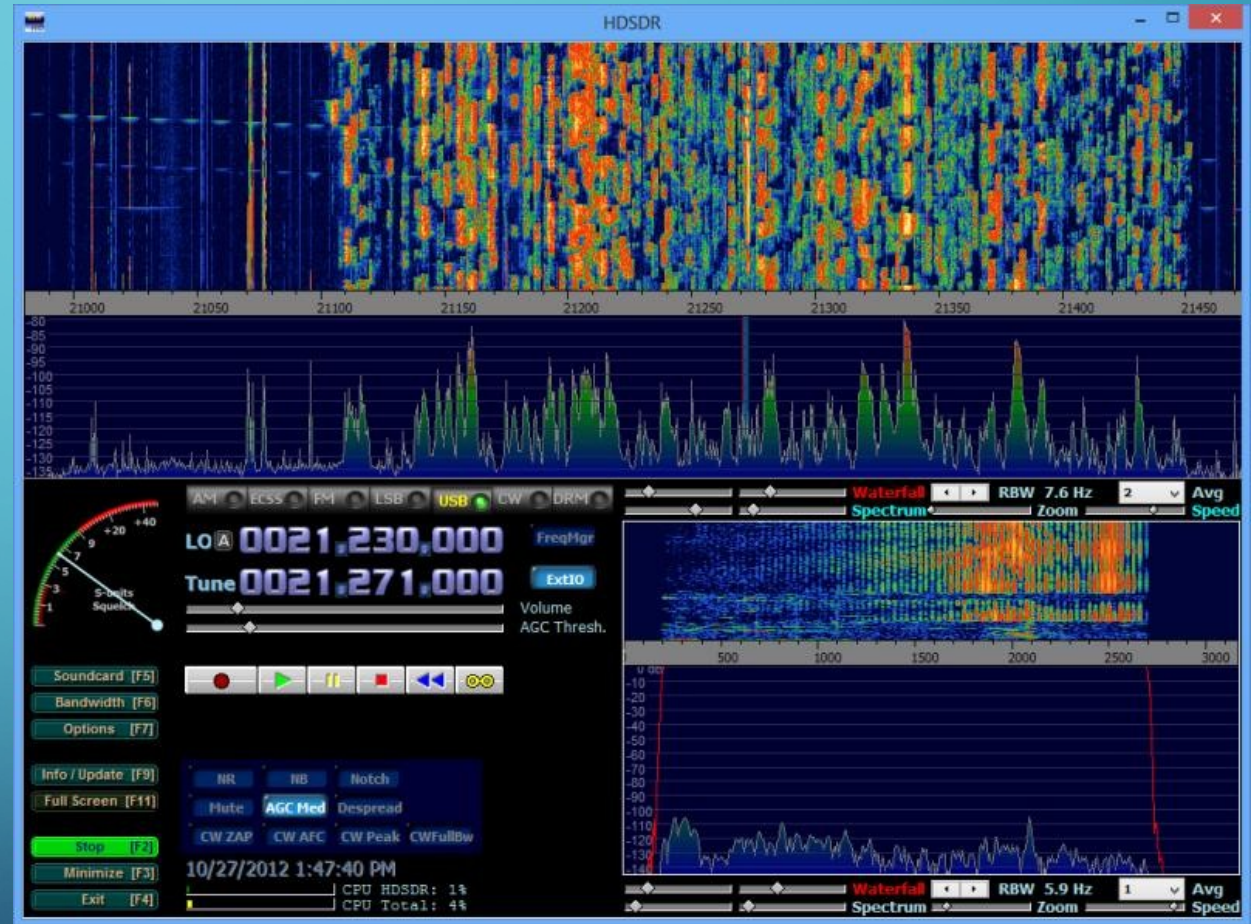
MY FIRST KIT BUILD

- Noticed that a fair number of “Good” rigs were kits
- Talked to another ham friend and he loaned his KX3 to me to try out – he built his from a kit
- “BIG MISTAKE” – Now I really can hear everything and this radio is a “monster”
- “I GOT TO HAVE ONE!” – they are a little pricey.....



MY FIRST KIT BUILD - MORE STUFF

- It took me a day or so to put together with no soldering – lots of little parts and I did not want to lose any parts
- It worked....
- I use it on Field Day for remote operation, in ARES/RACES events and remote QRP operation
- I love it (even today)
- I even got a surplus (almost free) laptop and can now see “all the action”
- If you ever really want to get confused, try copying two voice frequencies simultaneously – one with the traditional radio output and the second frequency on the laptop (using HSDR or other program) to extract the second frequency from the I/Q data streams – CW Skimmer?



MY FIRST KIT BUILD – MORE STUFF CONTINUED

- I could also investigate VHF / UHF / Microwave projects to support local emergency services
- I can also consider DTV projects – but limited applications in the local area
- But.. the new rig can only put out ~10W (depends on band , antenna, battery condition.)
- I need an amplifier.... (for home QTH used with the fan dipole)
- Should I get a prebuilt amplifier or try my skills at kit building again?
- There so many options out there....

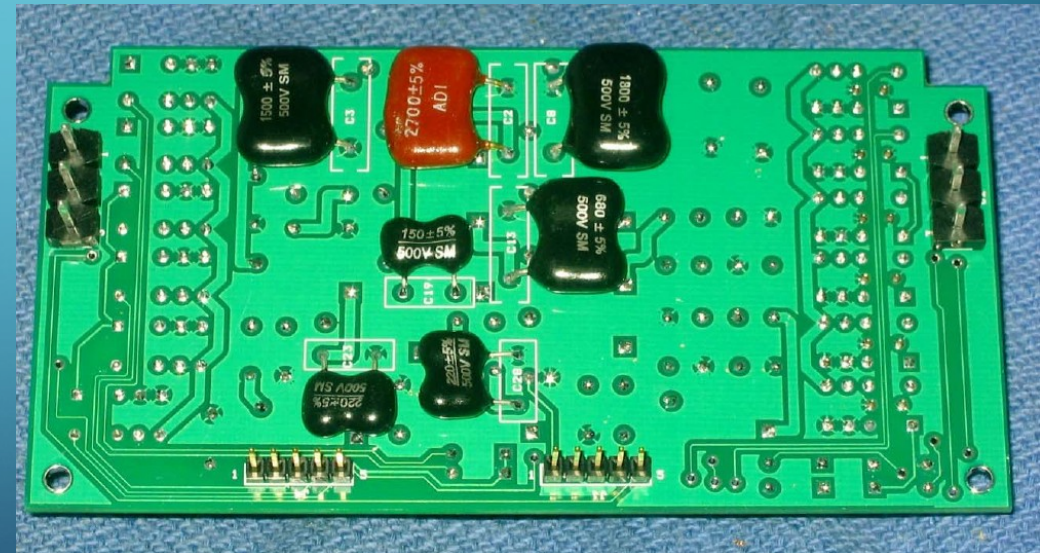
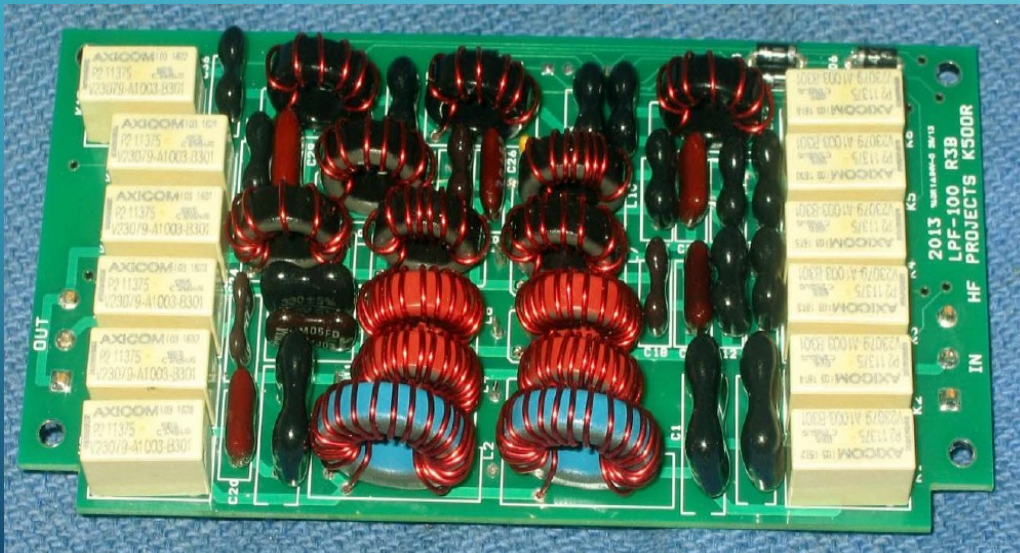
MY SECOND KIT BUILD

- Building an solid state 100W HF amplifier is “A LOT” more complicated than it first appears..... (35W HF amps are much easier to build)
- I got mine to work.... eventually
- It puts out full power on all bands but 160m through 20m - has issues with low pass filter for 17m to 10m bands - hard to wind coils to meet requirements
- Generally do not use upper bands at home QTH - so I am happy



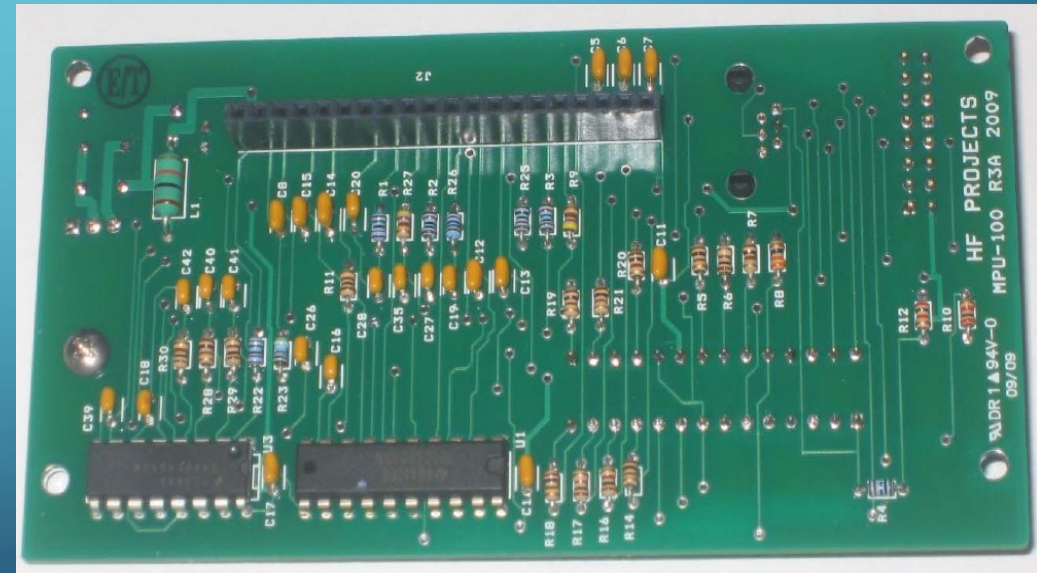
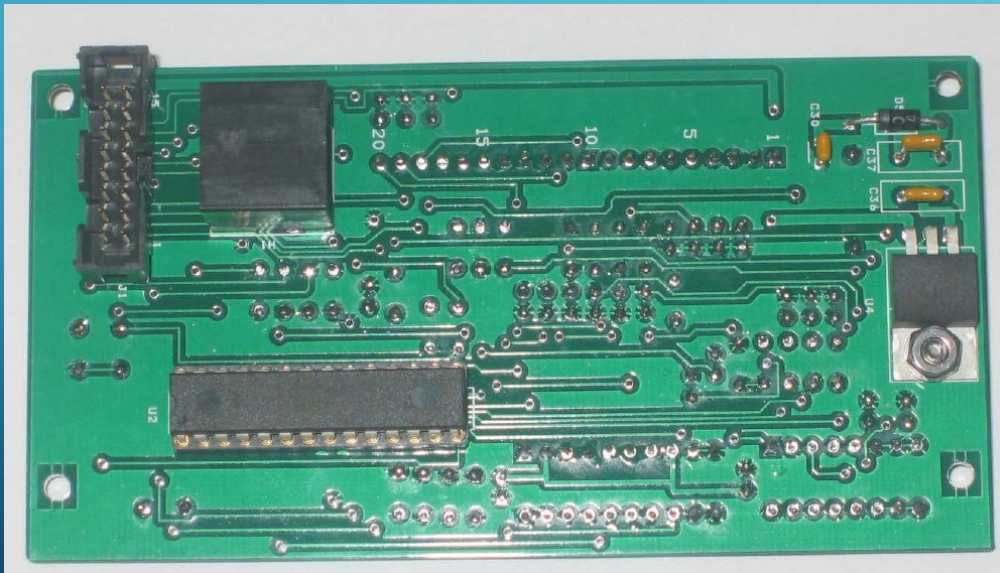
MY SECOND KIT BUILD

- LOW PASS FILTER CARD
 - Lots of hand wound inductors



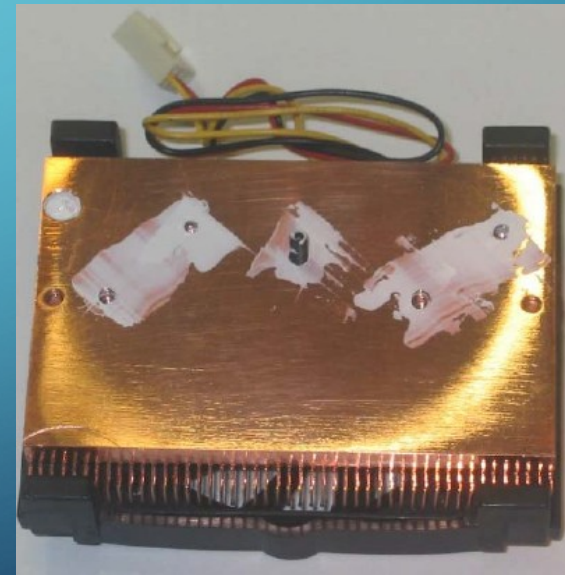
MY SECOND KIT BUILD

- PROCESSOR CARD
 - Lots of connectors (hard to get to fit with everything else)



MY SECOND KIT BUILD

- RF POWER CARD (AND HEAT SINK)
 - **Can I ever get the heat sink to fit correctly on the RF power card?**



ONGOING ACTIVITIES

- Support Western Country Cousins Net - 3970KHz @ 9:00PM Pacific Time daily (I do occasional net control duties on Mondays as well as being the webmaster - www.wccnet.us)
- Support Cupertino Amateur Radio ARES/Races (CARES) <http://www.cupertinoares.org/index.php>
 - Field Day, Big Bunny Fun Run, Super Hero Run, packet radio activations, search & rescue
- Study Tucson Amateur Packet Radio TAPR <https://www.tapr.org/> projects for interesting activities - extreme digital ham radio - check out Ham Radio Now you tube videos of the TAPR conference proceedings for the latest news on all things digital in ham radio
- De Anza Swap Meet - <http://www.electronicfleamarket.com/> every second Saturday of the month March through September - some times, you find a treasure
- Be a mentor (Elmer) - a new or want to be Ham.....
 - Loan out a radio / antenna to get some one on the hook.

MY POTENTIAL NEXT PROJECT

- Support local ARES / Races group by building up a complete portable self contained and self powered packet radio station to pass 911 traffic when all communications has failed
- Must be able to operate stand alone – the biggest issue is with power generation to support extended operations
- Also need to have sufficient water / food / shelter to support yourself until an effective response can be made
- It helps that my wife has a ticket (Tech.) and both sons have tickets (one Tech, one General)
- It helps that my wife also is a CERT (DSW) person interested in community service – we both volunteer for various ARES / Races / Cares events

MY POTENTIAL AFTER NEXT PROJECT

- “MESH Networking” looks interesting – implement a high speed self discovering self configuring fault tolerant wireless computer network using the amateur radio bands that can be used with most types of computer network products as cameras, telephone or computer – can not be part of the internet due to FCC regulations
- <http://www.broadband-hamnet.org/which-hardware-to-use.html>
- Ubiquiti hardware has issues with recent model releases – relatively high power operation – operating range is dependent on model / antenna configuration – can be substantial
- Linksys hardware has issues with recent model releases – low power operation – only usable for distances less than 300 feet
- Need to locate older hardware that is compatible with the Mesh firmware upgrade – there is a risk of bricking the hardware that is unrecoverable – expensive mistake