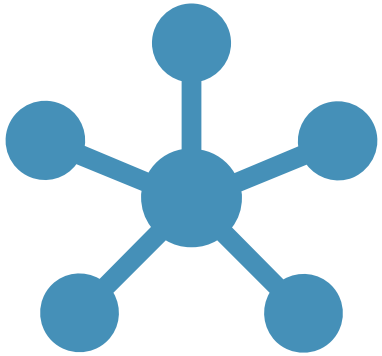
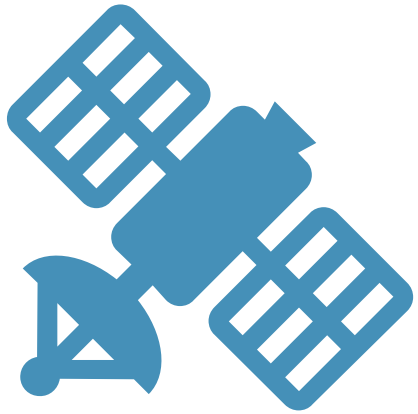
THE VWS IRF510 AMP CIRCUIT.

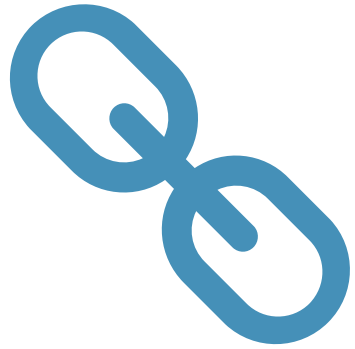
AKA ~ SMOKING THE FINAL. BY PETE JULIANO, N6QW 5/19/2021



Parts



Layout



Good Soldering

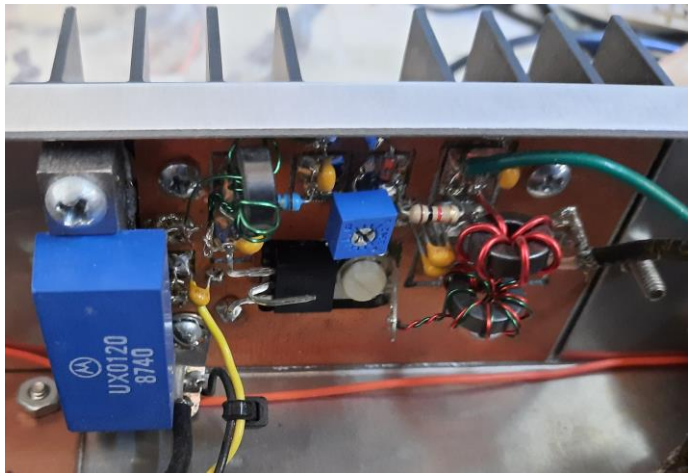
TECH REQUIREMENTS ~ HOW TO BE SUCCESSFUL?

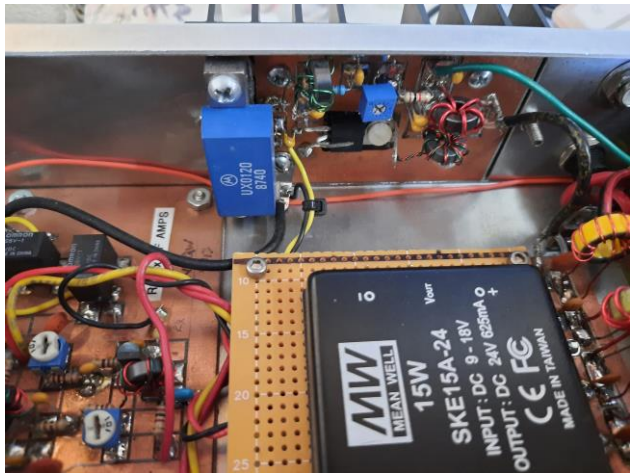
START AT THE FRONT END …

- What does a Good RF Amp do? (It CLEANLY amplifies the input signal)
- How much Power will it deliver? (13dB Power Gain ~ 250 mw in for 5000 mw out)
- What Class of Amplifier (The ABC's)? (Depends on the Bias; but most likely AB)
- How Rigorous must be the Build? (The Layout Factor ~ IN's/OUT's segregation)
- Parts for the Amp (Use Quality Parts)
- Heatsink Requirements (If it is too hot to touch – not enough sink)
- Are there things that can "jimmy" (boost) the output?

TURNING A SIZE 29A INTO A 44DD

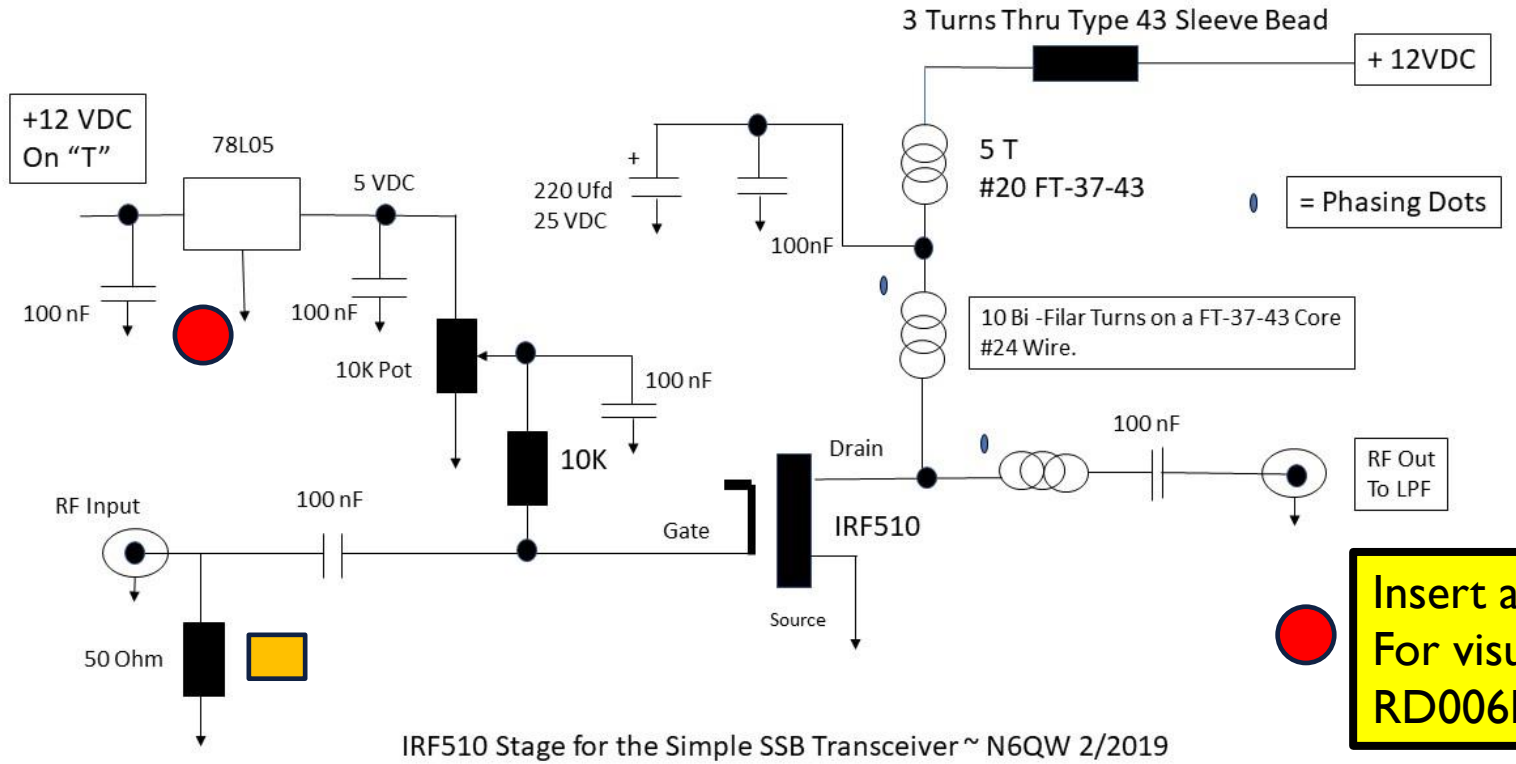
- **A huge gain in output with a couple of changes: Drive with a 24 VDC Gain Block Amp & 24VDC on the IRF510 Drain**





- **Use a 9-18 VDC INPUT to 24 VDC @ 650 ma output DC to DC Convertor. At 55% efficiency about 9 watts**
- **Now back down to Earth – just possibilities!**

THE IRF510 RF AMPLIFIER SCHEMATIC



IRF510 Stage for the Simple SSB Transceiver ~ N6QW 2/2019

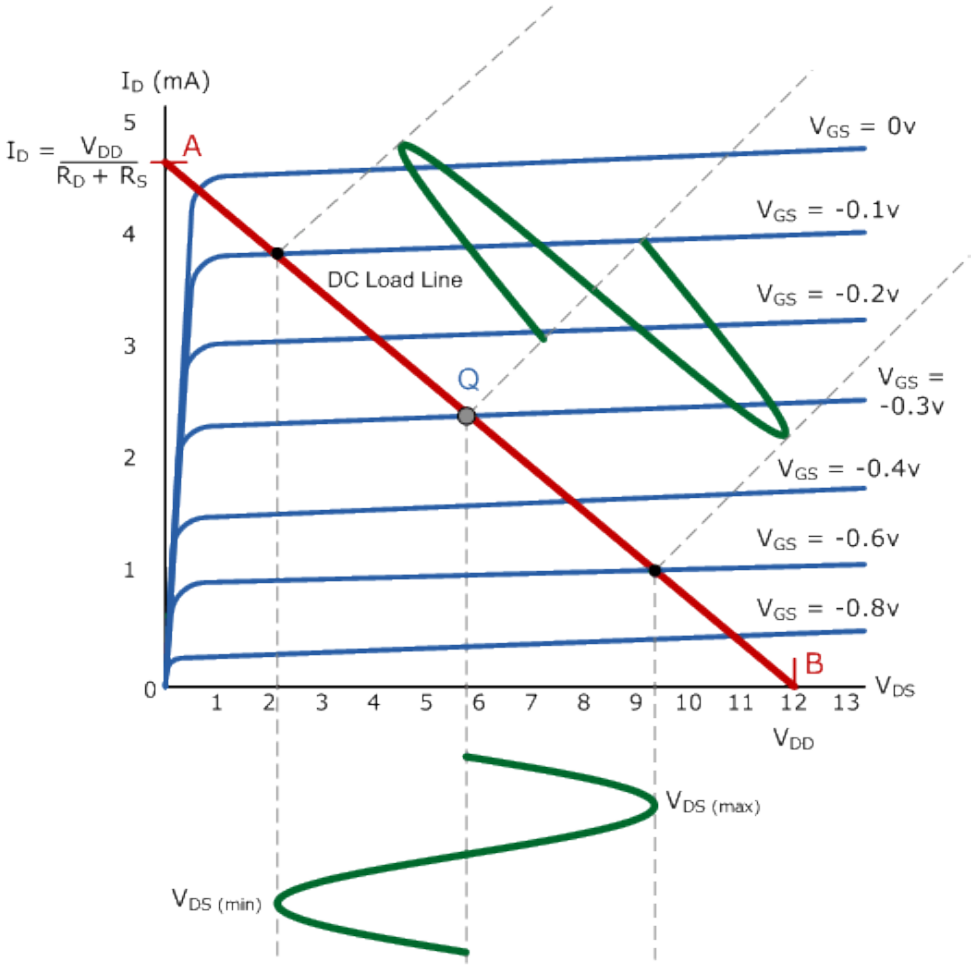
Insert a Red LED to GND
For visual and if running the
RD006HHF1

Band Aid for Stability. May not be required.

SOME ITEMS I WILL NOT COVER TODAY!

- **A Detailed Analysis of the Amplification Process ~ You Tube is your Friend! https://www.youtube.com/watch?v=5T84Jzcgj7M**
- **How to set up Load Lines on I/V characteristic curves and trace signal inputs to demonstrate the signal output waveform**
- **Other Amplifiers candidates such as MRF260, 2SC2166 or the RD06HHF1**
- **You will smoke several IRF510's which are far cheaper than the prior devices. It Will Happen!**
- **The Emphasis is to accept the IRF510 is a well known device for use in ham rigs**
- **The real thrust is to adopt a standard layout and use that. This is not a creative opportunity!**
- **Build Per Print!**

SO, OK I LIED – LOAD LINES!



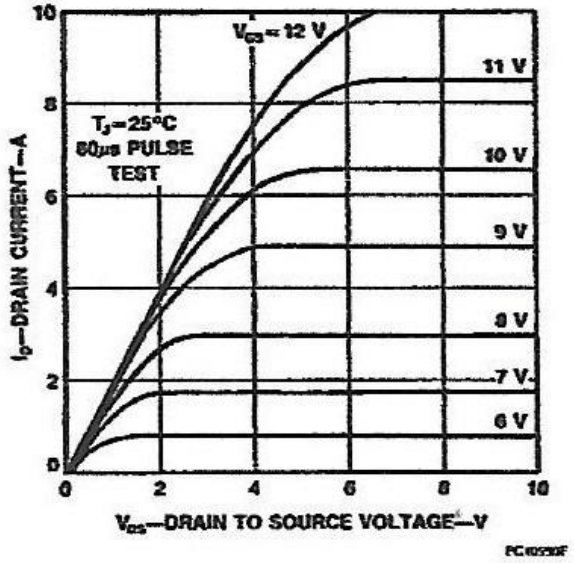
44.722 Volts PTP
Across 50 Ohms
Equals 5 Watts

TYPICAL I VERSUS V PLOT FOR THE IRF510
(KEEP IN MIND THIS IS A SWITCHING MOSFET NOT AN RF DEVICE)

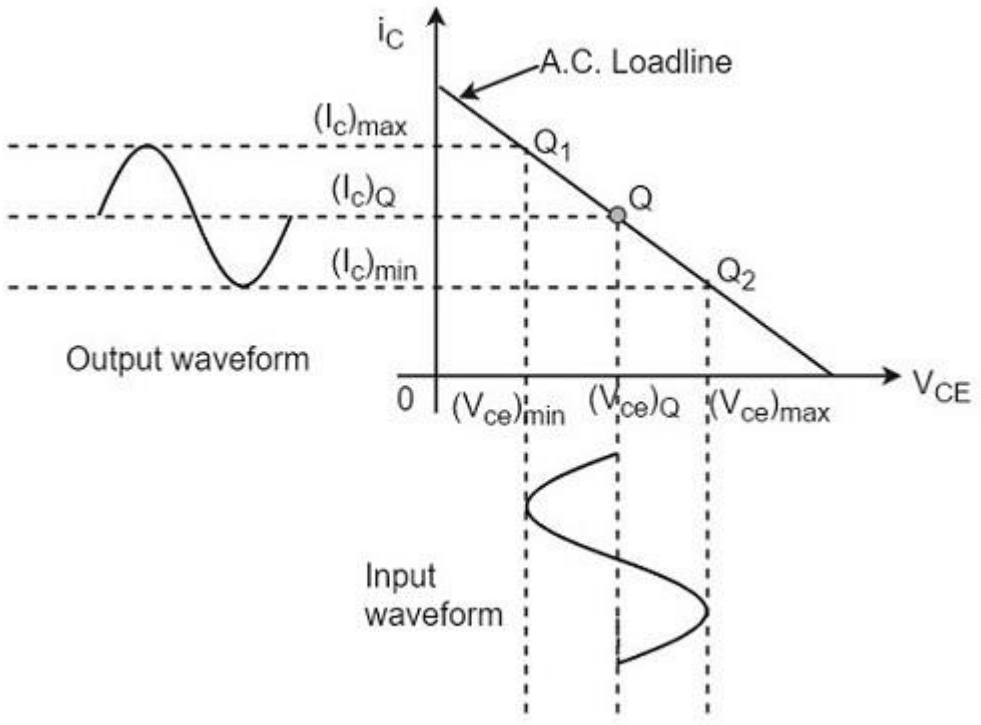
Notes
1. T_J = +25°C to +150°C
2. Pulse test: Pulse width ≤ 80 μs, Duty cycle ≤ 1%
3. Switching time measurements performed on LEM TR-58 test equipment

Typical Performance Curves

Figure 1 Output Characteristics



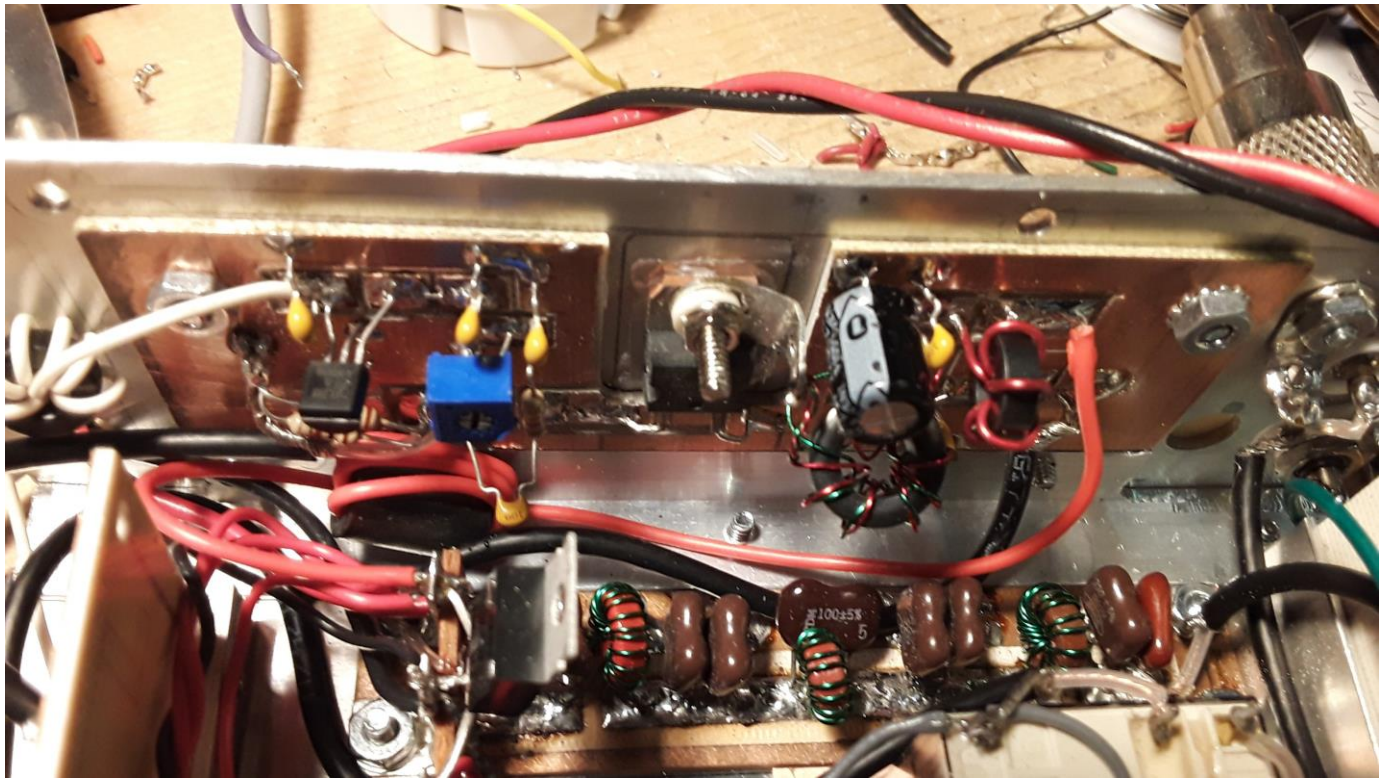
MORE LOAD LINES



Now This is Done in a Computer Simulation Program. But you can Do it the Old School Way!

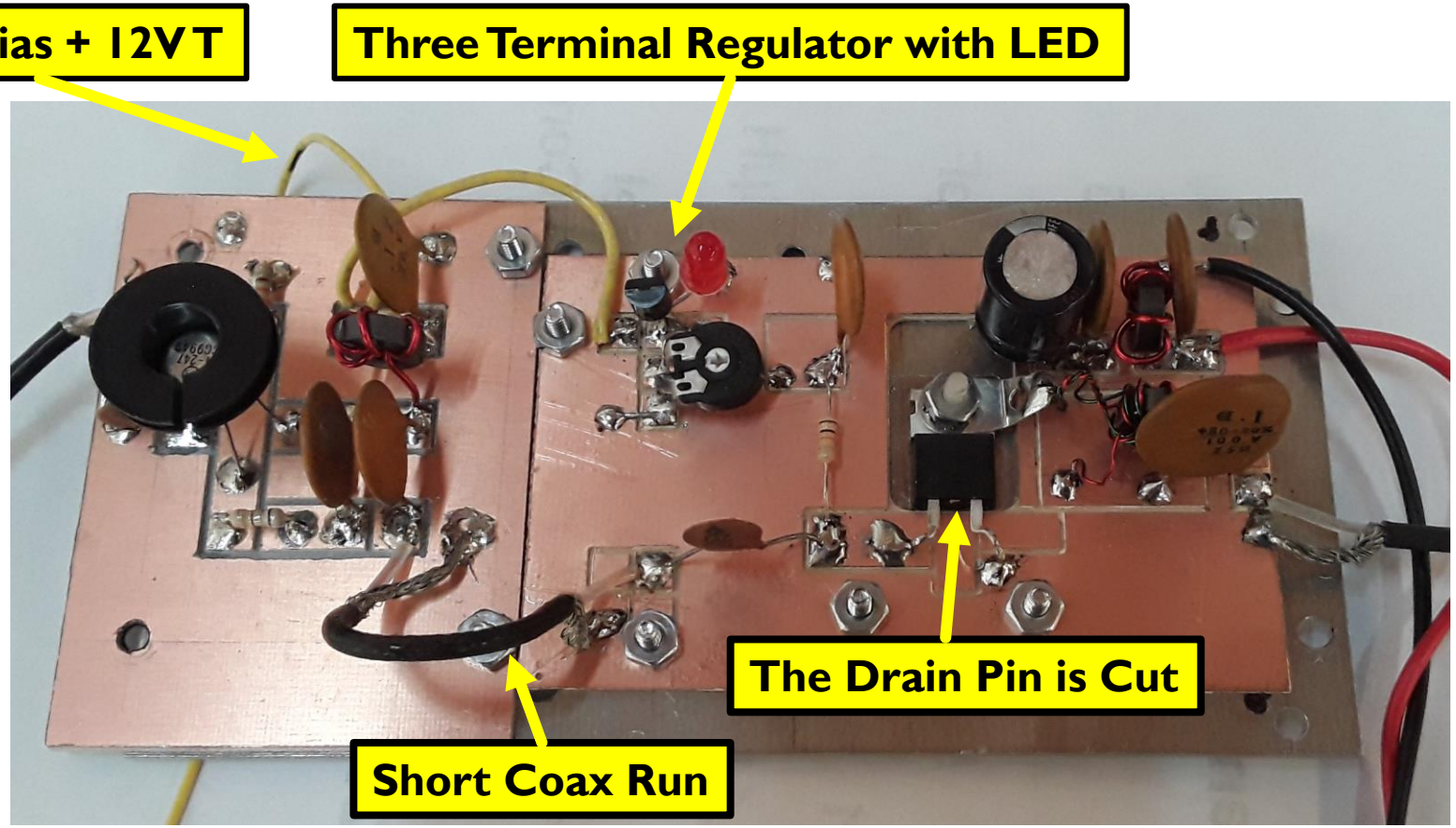
THE SSSB FINAL AMP BOARD AND LPF

The Layout is the Standard but the Board was cut down In size to fit what I Had for a back panel.



Note the Cut Off Drain Pin and SM Caps in the LPF (extravagant but solid).

ANOTHER DRIVER & FINAL BOARD

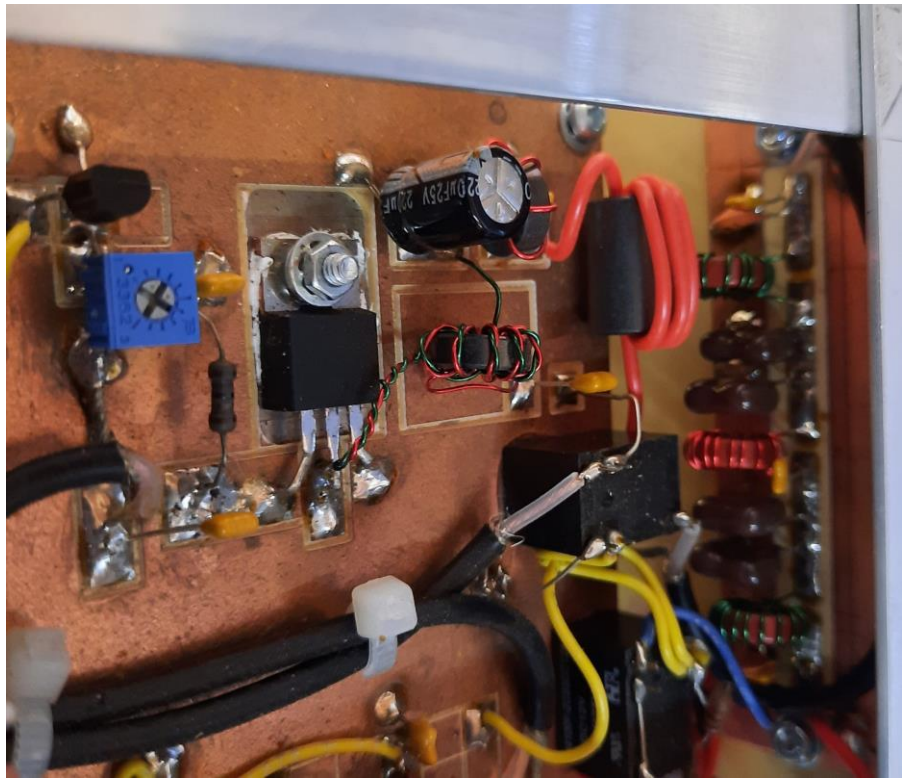


MORE IRF510 AMP STAGES

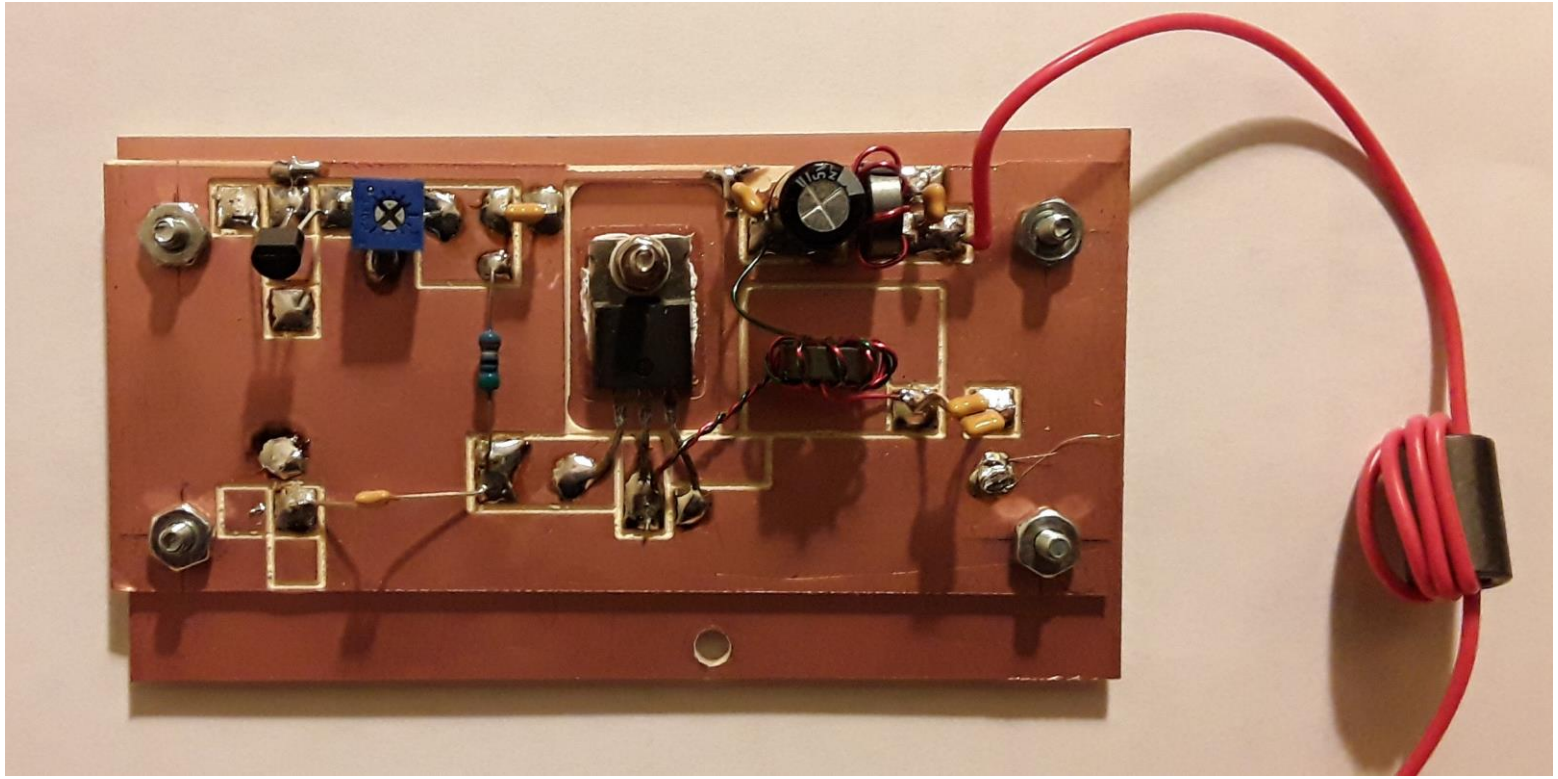
Note: This Amp was milled
Onto a circuit board that
Is stacked above another
Board using 1" Al Pillars.

To handle the IRF510 heat
A piece of aluminum plate
¼" and 3" X 4" is bolted
To the underside of the
Top circuit board.

Works FB.

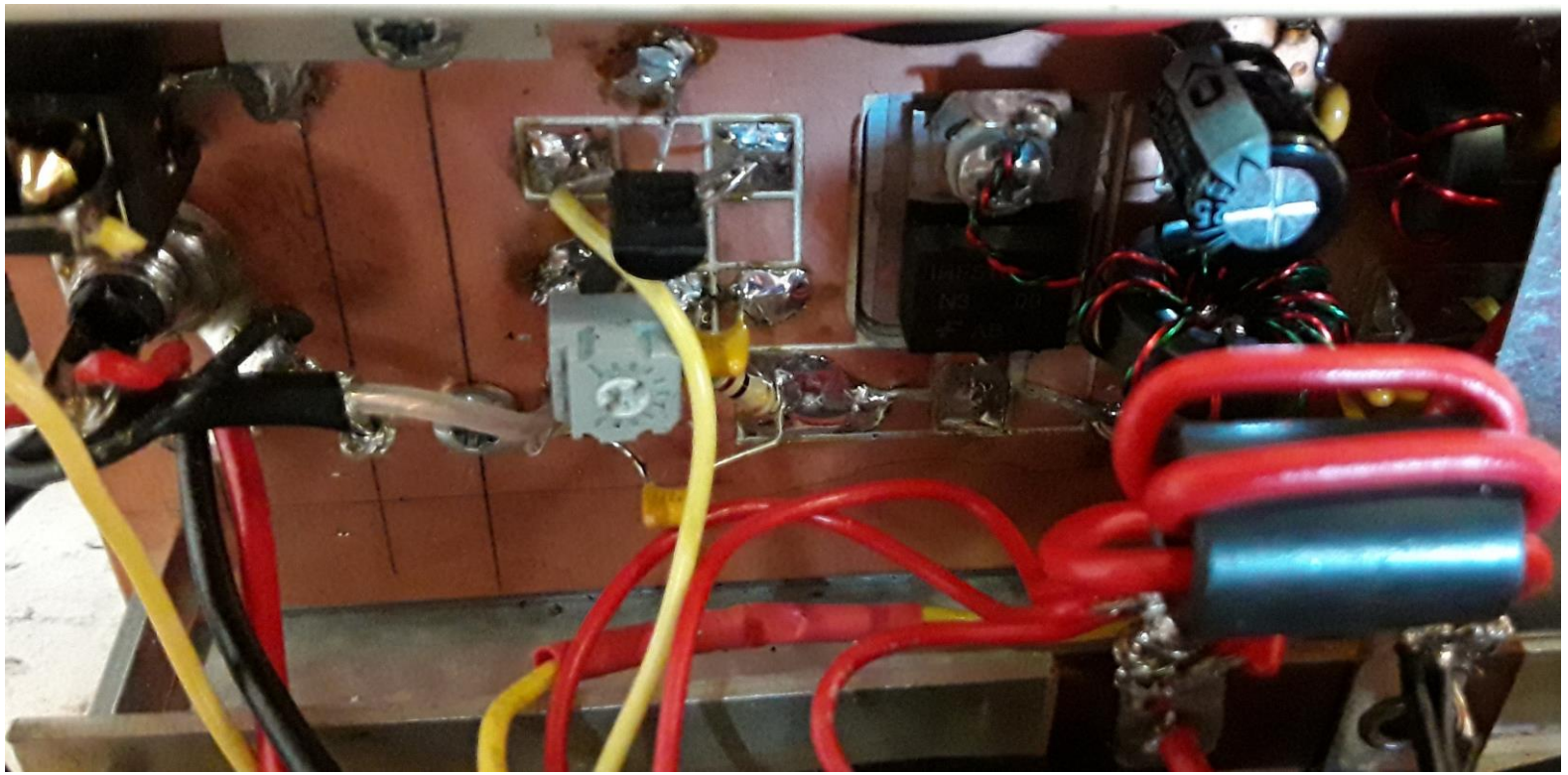


MORE EXAMPLES OF FINAL STAGES

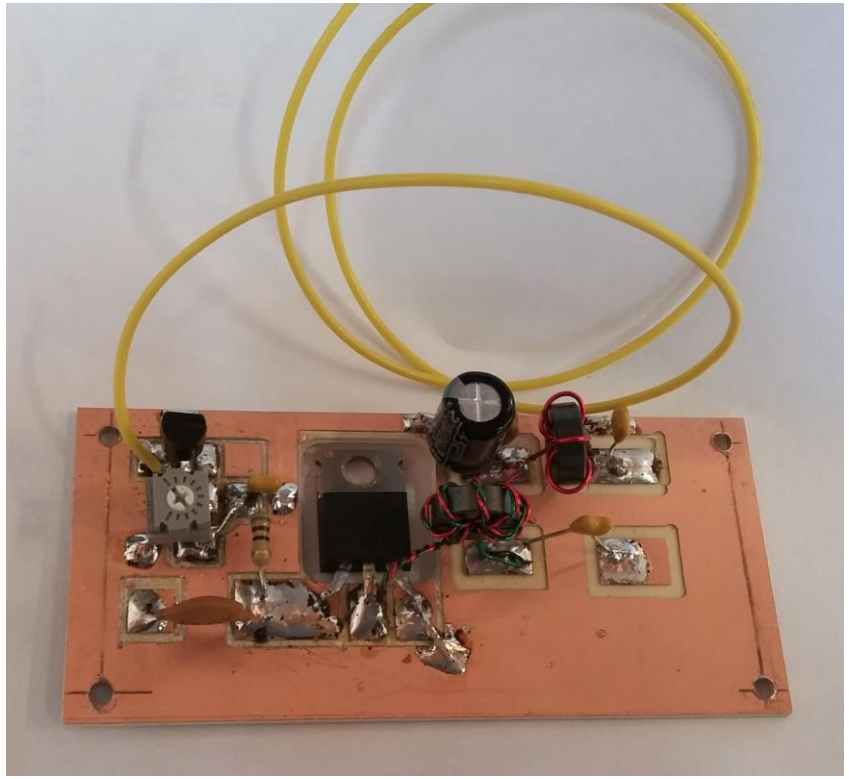


This follows the same general layout; but pre-dates cutting off the Drain Pin!

ANOTHER EXAMPLE ~ DRAIN PIN CUT OFF!



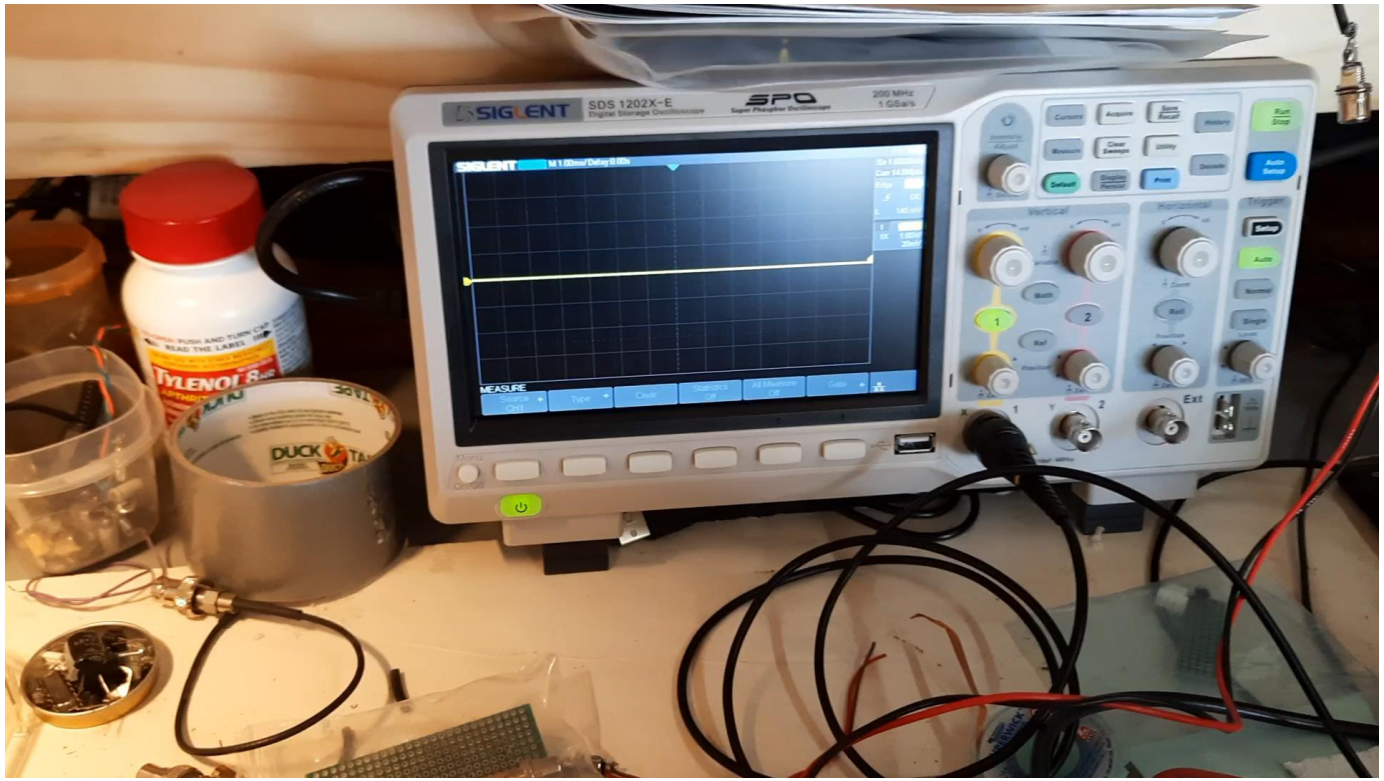
IN THE SUDDEN TRANSCEIVER ~ SAME GENERAL LAYOUT



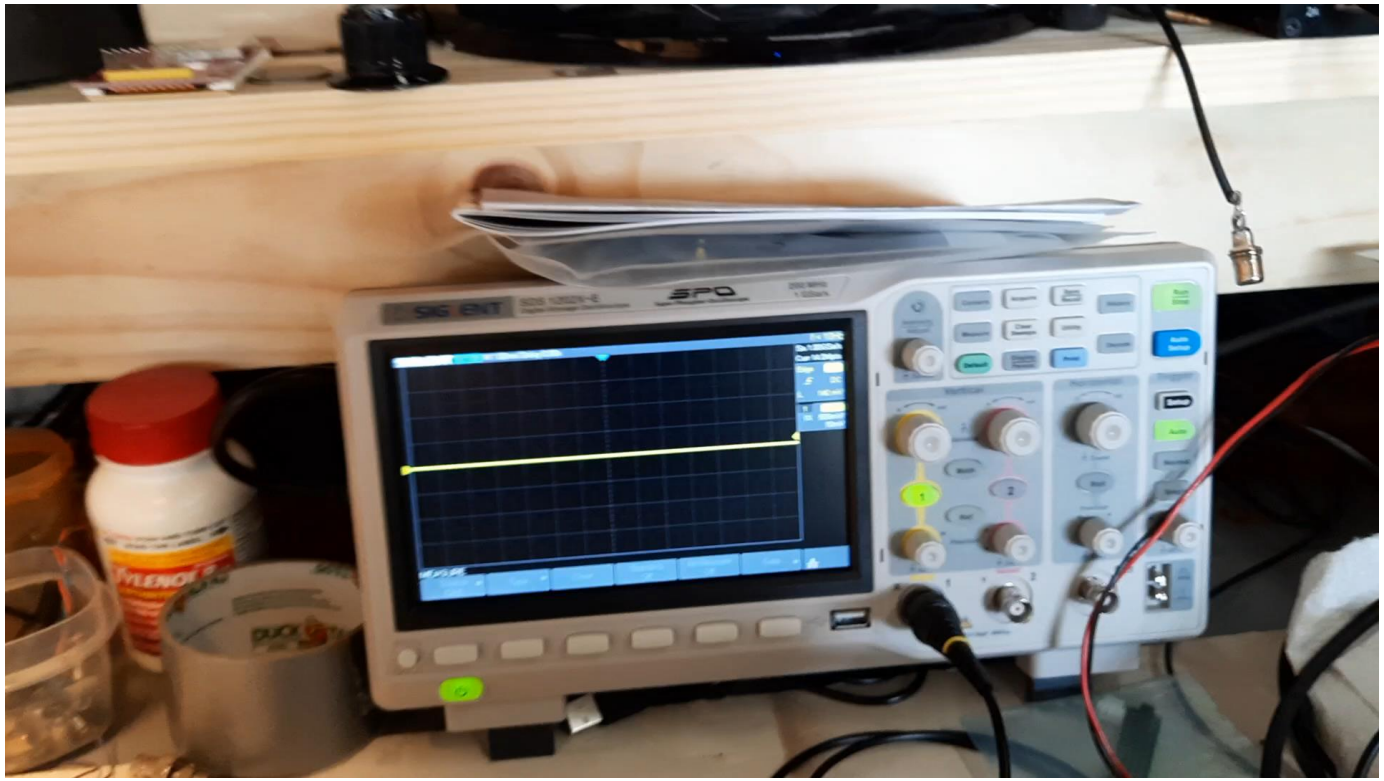
Notes:

1. Pre-Dates the Pin Cut Off
2. 50 Ohms versus 10K Ohms
3. Have Gone Back to 10K

A LITTLE RF FROM AN IRF510



ADJUSTING THE BIAS AND MIC GAIN POTS ~ WHAT TO LOOK FOR?



PROPER BIAS VERSUS THE CLASS OF OPERATION!

QUESTIONS, COMMENTS, INPUTS?

- **Thanks for taking on the build of the Simple SSB!**

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