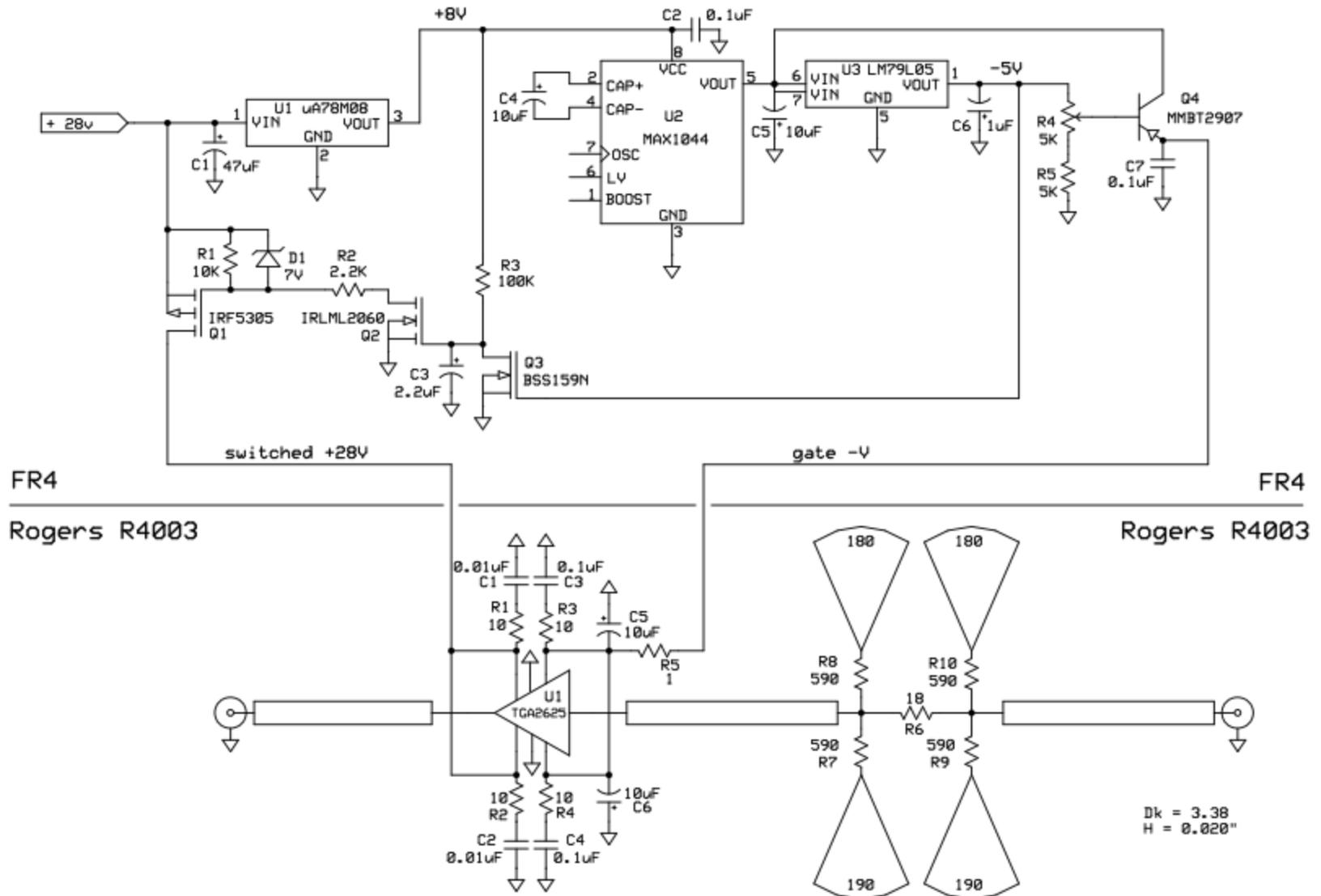


10 GHz PA & LNA

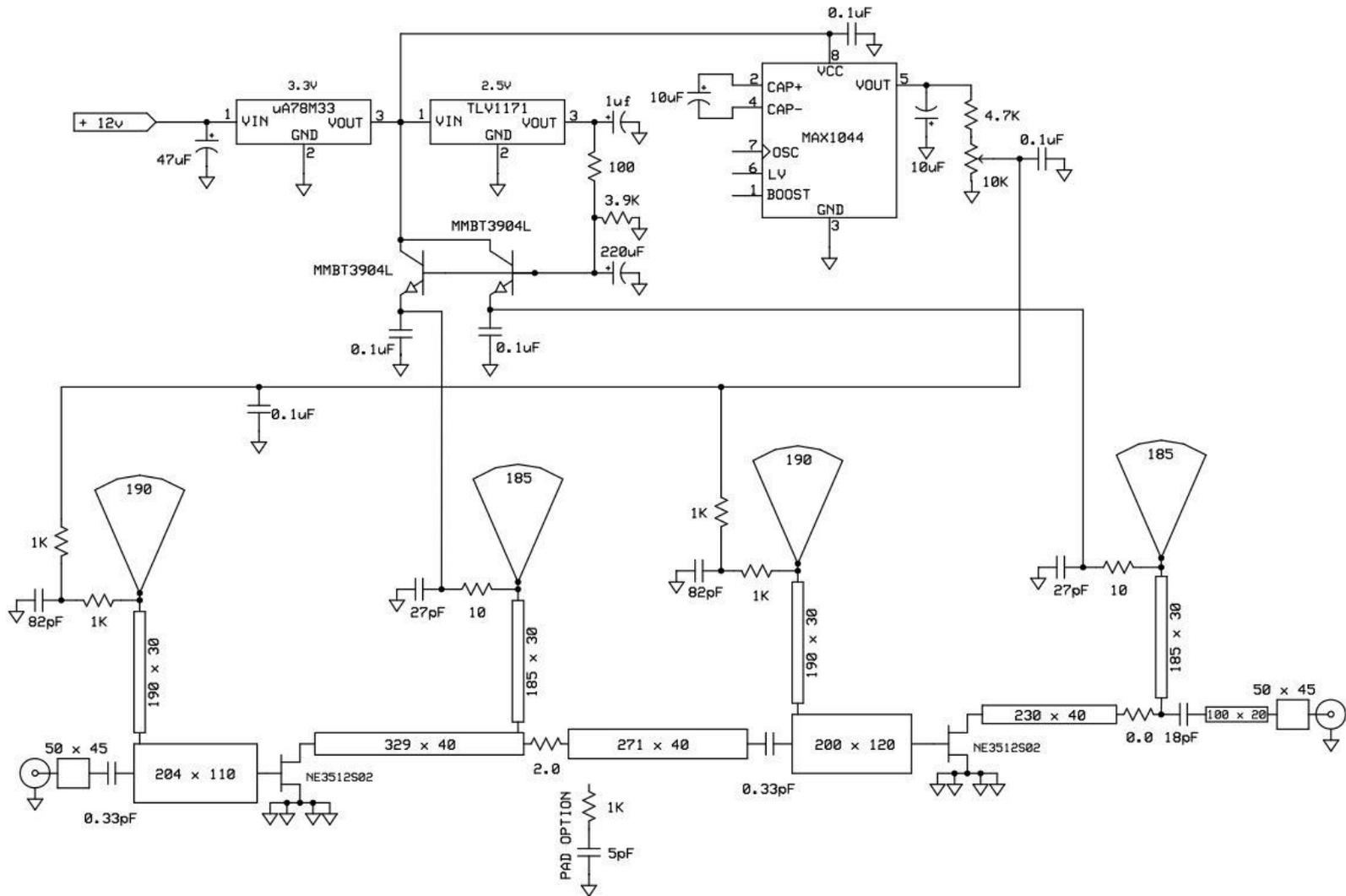
*ASSEMBLY TIPS
BY K5TRA and NO5K*



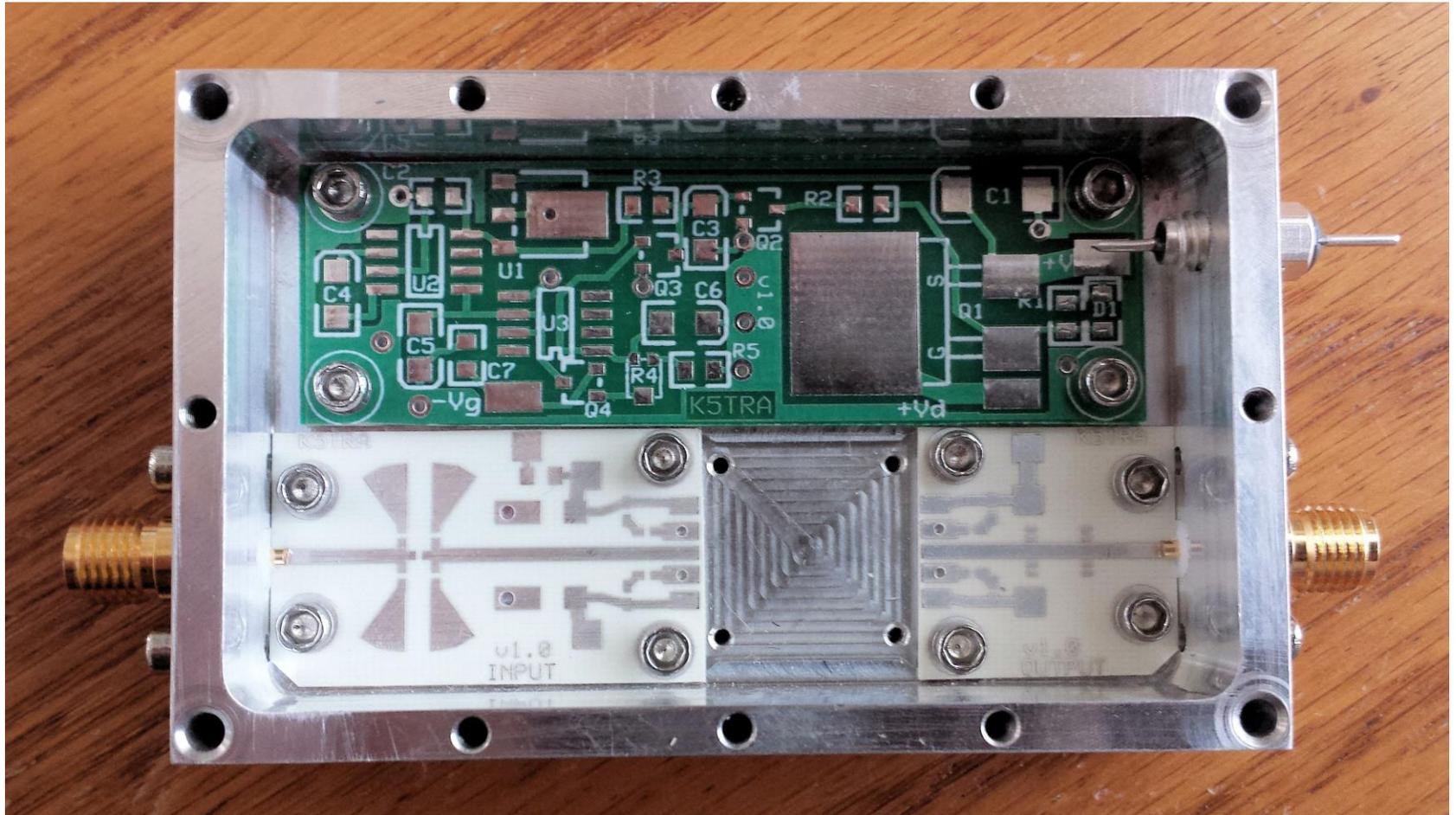
PA Schematic Diagram



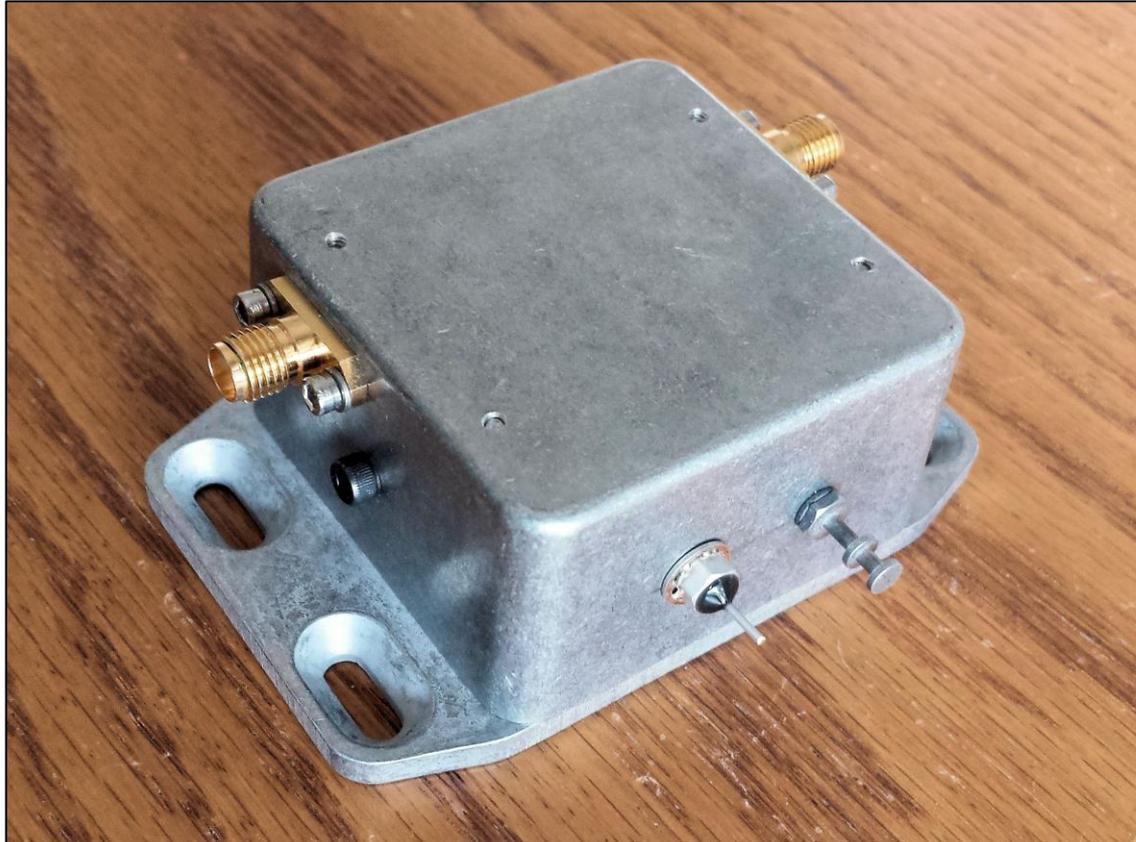
LNA Schematic Diagram



PA Assembly – boards not populated

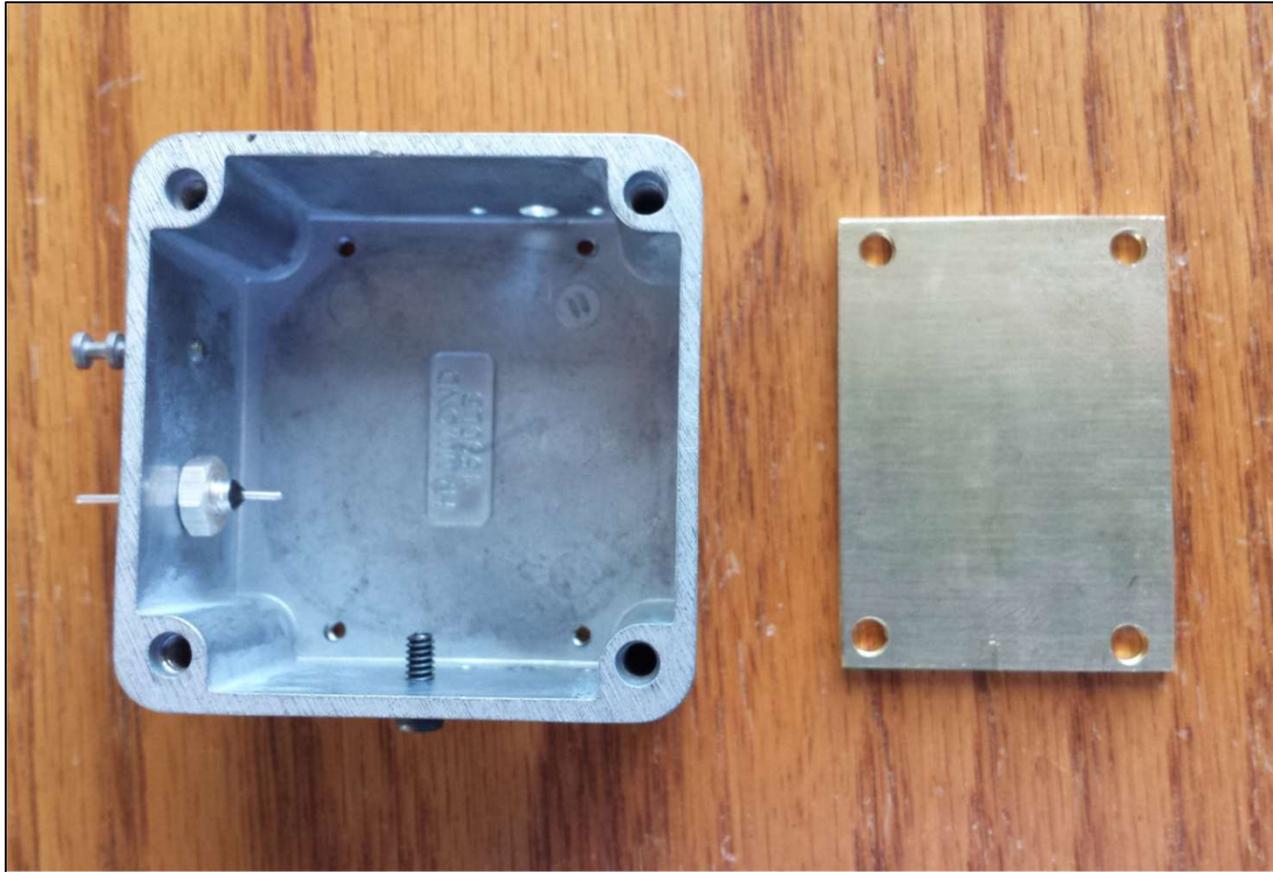


LNA Assembly



Hammond 1590LB(FL) enclosure - \$6.29

LNA Assembly – board not populated



- 0.093" brass spacer below RF board

LNA Assembly – board not populated



- uA78M33 TO-220 regulator mounted on inside wall

Important Considerations

- RF interfaces are path length critical
 - SMA to RF board
 - PA MMIC to RF board
 - Board ground at input/output edges
- Be careful with screw hardware
 - PA MMIC requires 0-80 x 0.1875" screws
 - PC boards require 2-56 screws (PA 0.1875", LNA 0.125")
 - PA lid requires 2-56 x 0.1875" screws
 - DON'T overtighten screws, you can damage the housing or twist off the screws
- SMA connectors
 - Use Amphenol 132147-47 SMA two-hole flange connector on PA
 - Trim connector dielectric for flush fit in LNA wall (razor or xacto)
 - Trim center conductor to .05" maximum extension past dielectric
 - I use jeweler's saw to trim center conductor
 - Use 2-56 x 0.1875" screws and lock washers

Important Considerations

- Trim all boards to critical size for assembly
 - RF boards can be trimmed with paper shears
 - Bias board width can be filed
 - Check all boards for fit BEFORE beginning assembly
- Assemble boards with hot air or fine tip solder station
- Bias circuit
 - Pretest bias circuit before adding RF devices
 - Preset PA gate bias voltage to -3.5 volts
 - Preset LNA gate bias to -0.4 volts

Important Considerations

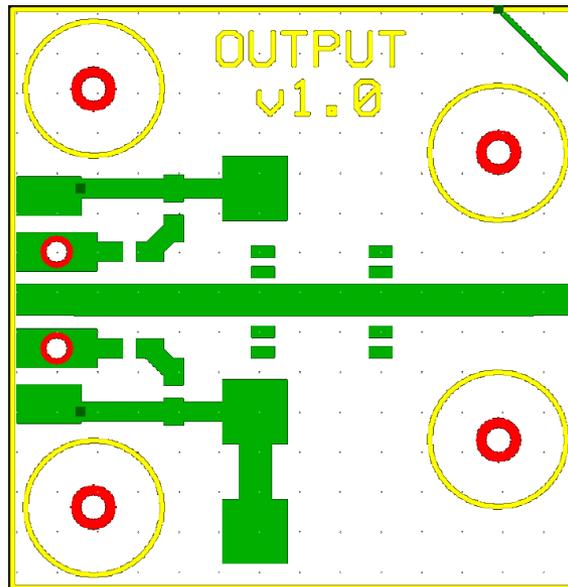
- PA MMIC and LNA FETs
 - Use static sensitive handling techniques
 - Check fit, then trim leads for proper board interface
 - Spread silver loaded thermal compound *very sparingly* on bottom of PA MMIC flange and LNA TO-220 (uA78M33) flange
 - Solder paste between leads and RF board contacts; heat to flow
 - MMIC will NOT TOLERATE rough treatment, lead flexing, or excess heat
- Attach Eccosorb strips on 3 axis walls with 2-sided scotch tape (inside top, end and side)

After Initial PA Construction

- Attach to heat sink
- Adjust bias for proper quiescent current
 - Apply load first
 - Apply +28 V
 - Adjust gate voltage for 365 mA (with no drive)
 - Gate voltage will be around -2.6 V
- Don't overdrive
 - $P_{in} = +14$ dBm yields approximately 10 W with $I_d \sim 1.13$ A
 - $P_{in} = +15$ dBm yields approximately 12 W with $I_d \sim 1.25$ A
 - If you have more drive, you will want to populate the optional input attenuator with resistors for appropriate pad
- Snow flake tune the output

After Initial PA Construction

- Snow flake output tuning
 - For optimum power
 - Compensation for imperfect output SMA transition
 - Compensation for imperfect MMIC transition



T.Apel

After Initial LNA Construction

- Apply +12 V
- Monitor performance with test equipment
- Adjust bias for NF and gain tradeoff
 - gate voltage should be around -0.4 V
- Snow flake tune input for NF and gain tradeoff

Final Thoughts

- USE COMMON SENSE
- IF YOU HAVE A QUESTION, ASK BEFORE DOING

Dish-feed with LNA and 12W PA

