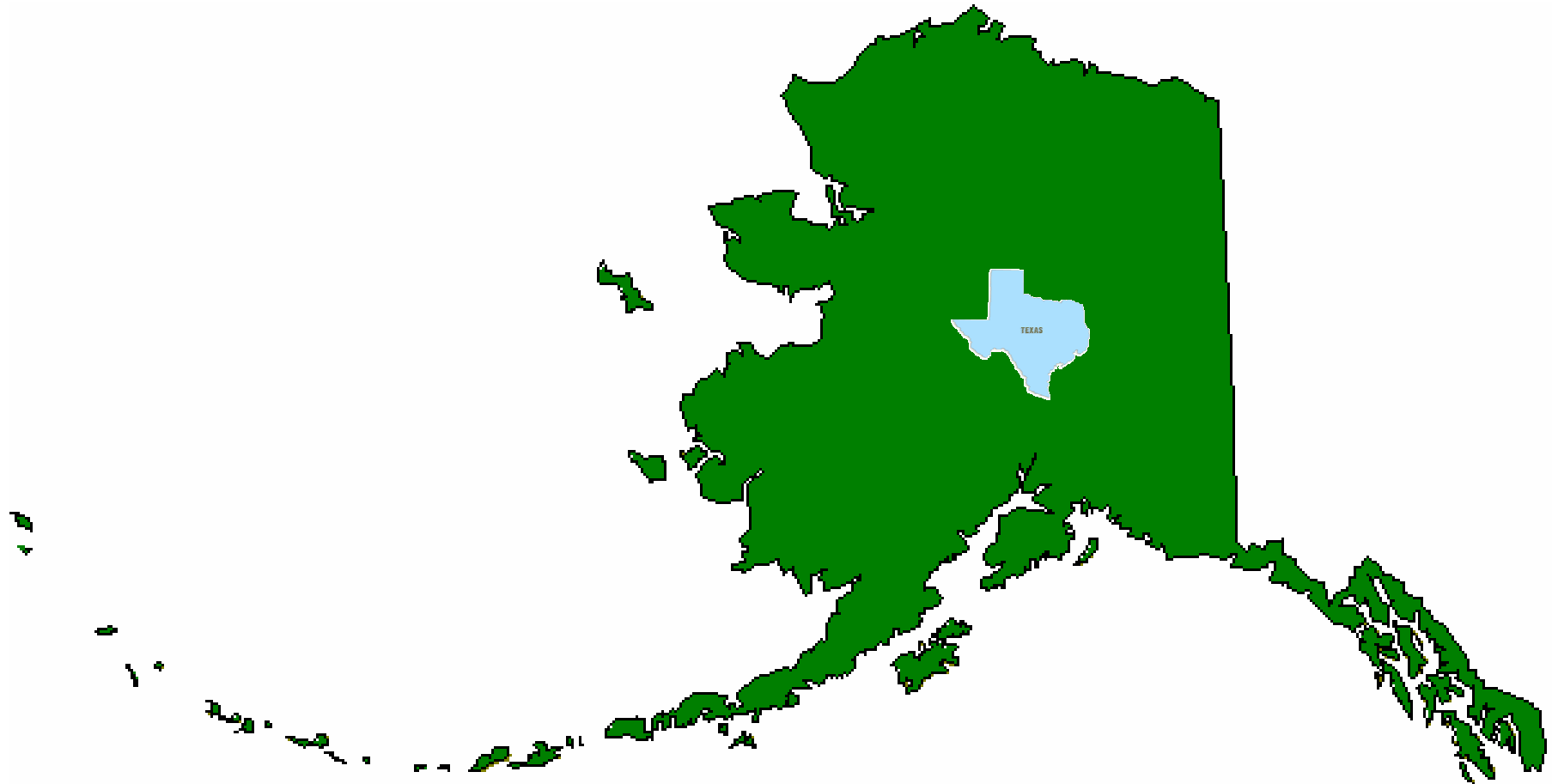


CONSIDERATIONS FOR CONSTRUCTION  
OF LNA / RELAY COMBINATIONS  
FOR EME

PRESENTED  
BY MIKE MELUM, KL6M  
EME-2010 DALLAS, TX

THANKS FOR HAVING US

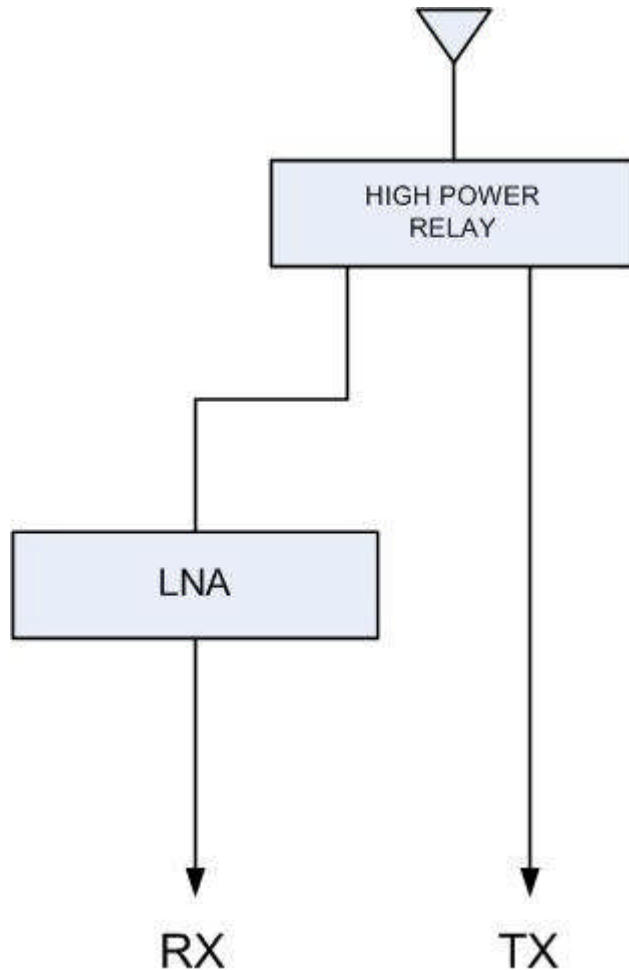


# CONTENTS

- CONFIGURATIONS
- RELAY TYPES
- ENCLOSURES
- NOISE FIGURE
- CONNECTORS
- CONCLUSION

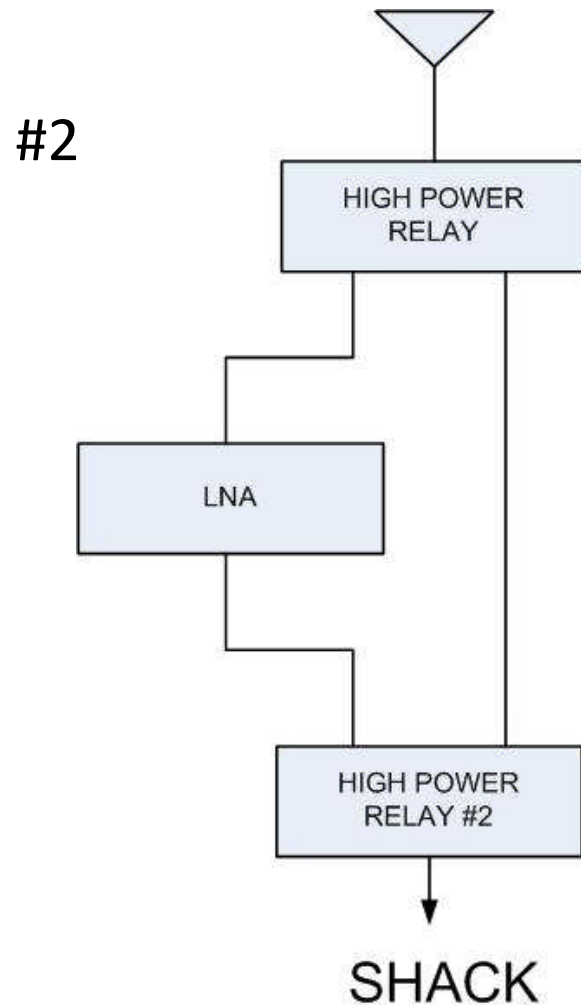
# CONFIGURATIONS (#1)

#1



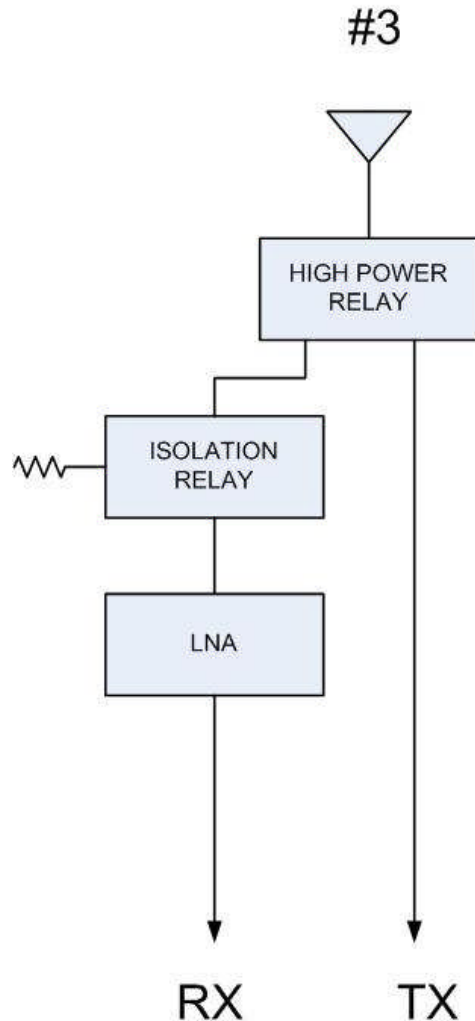
- RELAY SPECS ARE CRITICAL IN THIS CONFIG
  - POWER HANDLING
  - PRIMARILY ISOLATION
    - ASSUME MAX LNA = 0dBm
    - ASSUME 1KW (60dBm)
- DRAWBACKS
  - TWO FEEDLINES
  - NO TERMINATION FOR LNA

# CONFIGURATIONS (#2)



- SAME ISSUES AS #1
- ADDS ADDITIONAL RELAY
- DELETES ONE FEEDLINE
- RELAY #2 ISOLATION PROTECTS OUTPUT OF LNA
- REQUIRES ANOTHER RELAY IN THE SHACK

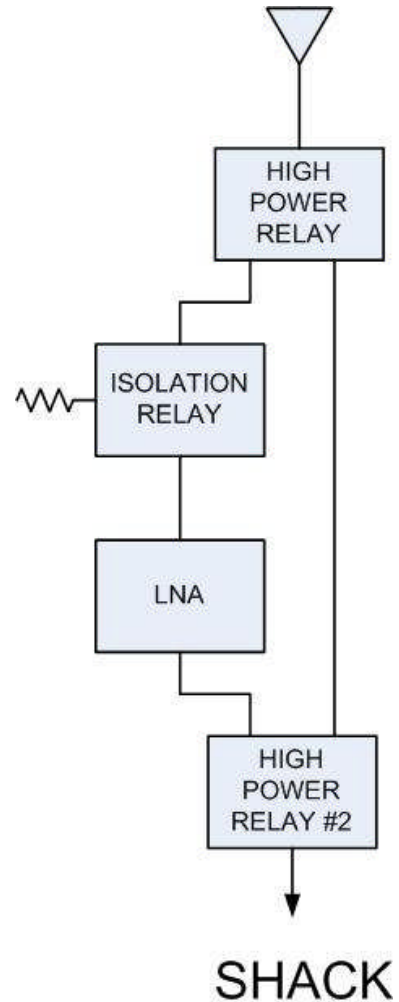
# CONFIGURATIONS (#3)



- This config is failsafe
- Provides LNA input termination
- Drawbacks
  - Two feedlines
  - Additional loss ahead of LNA
- Trade-off = safety vs performance

# CONFIGURATIONS (#4)

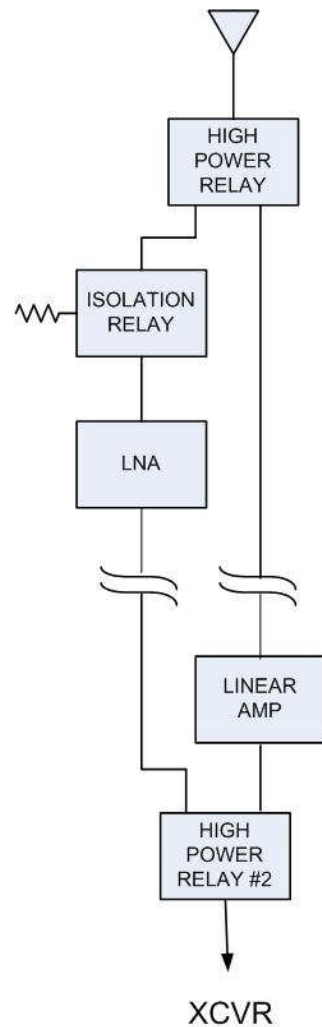
#4



- Variation of #3
- Adds additional high power relay at the antenna
- This relay needs to have high isolation
- Drawback is the need for additional relay in the shack

# CONFIGURATIONS (#5)

#5

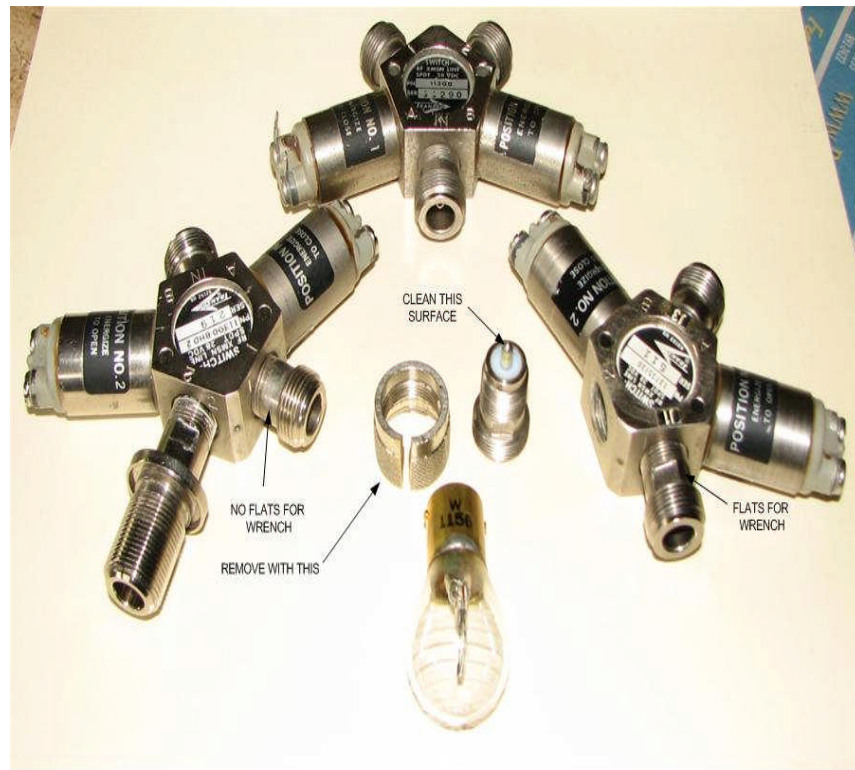


- YET ANOTHER VARIATION
- Same basic features as #3
- Two feedlines
- Relay #2 needs less isolation



# RELAYS

- Transco-Y
  - Designed in 1950's
  - Available
  - Low loss (0.05dB)
  - High Isolation (60dB)
  - High Power Capability (>KW)

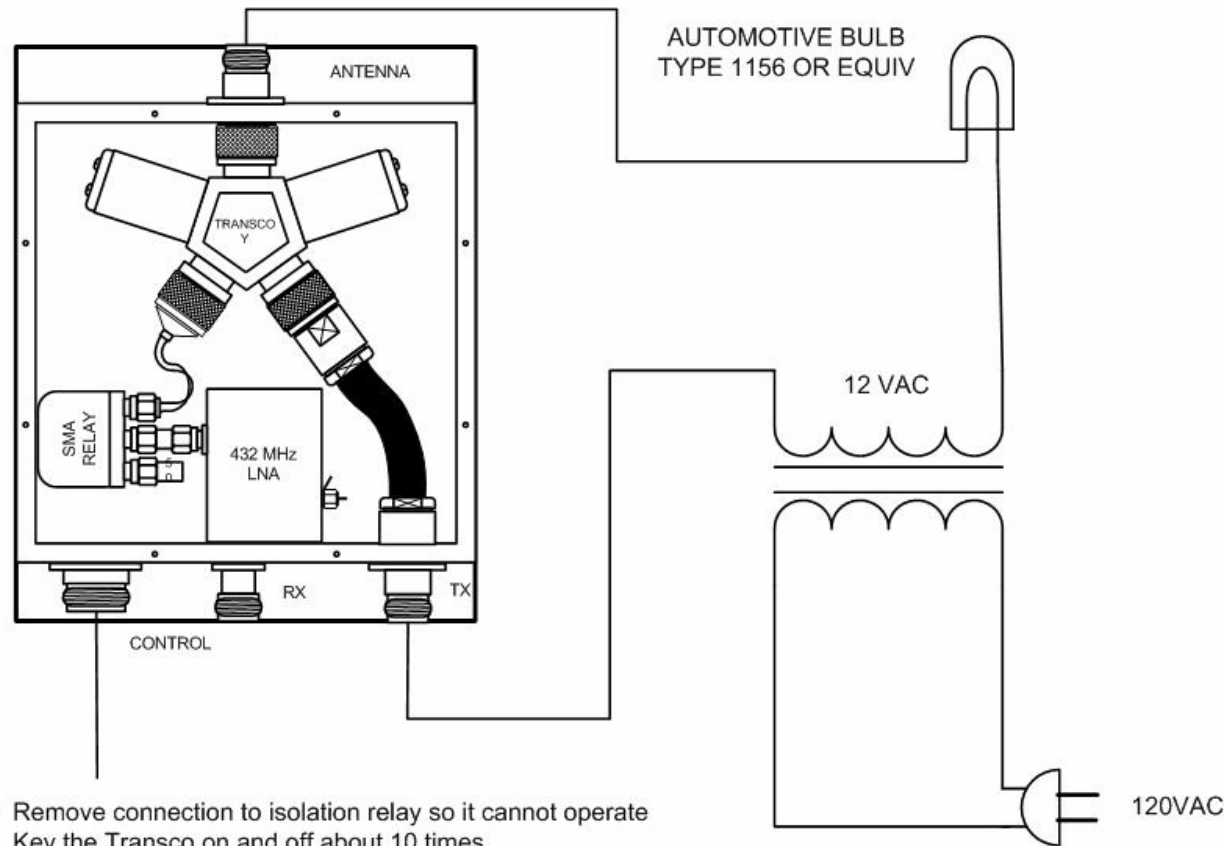


# RELAYS

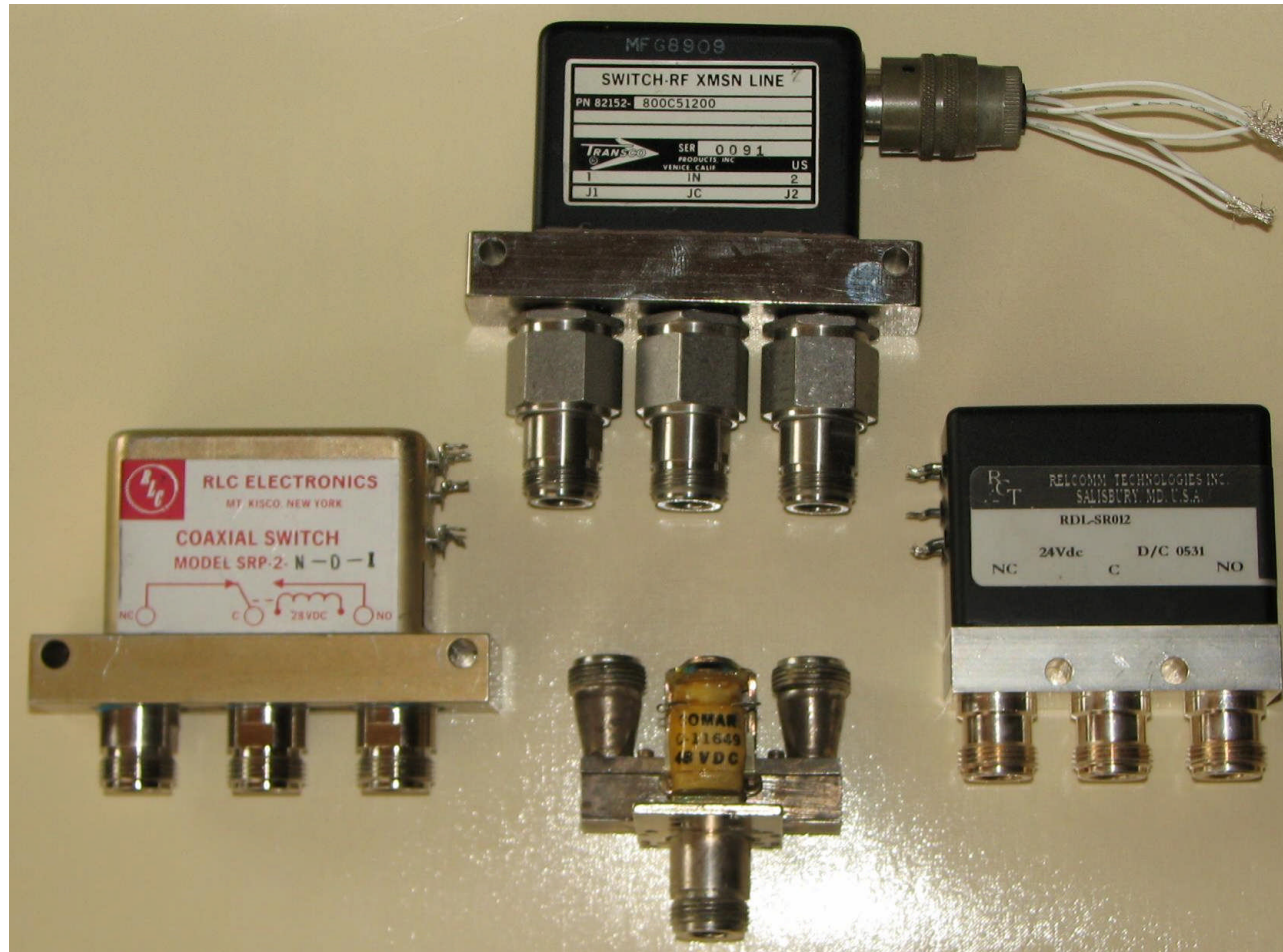
- More about the Transco-Y
  - Check ‘em...they are old!
  - DC resistance of contacts  $< 0.2$  Ohms
  - Intermittent or  $> 0.2$  Ohms = Service!
    - Remove connectors and clean contacts
    - Solvent and steel wool
    - N-C coils - Energize coil to reassemble
  - Coil replacement may require heating of set screws

# RELAYS

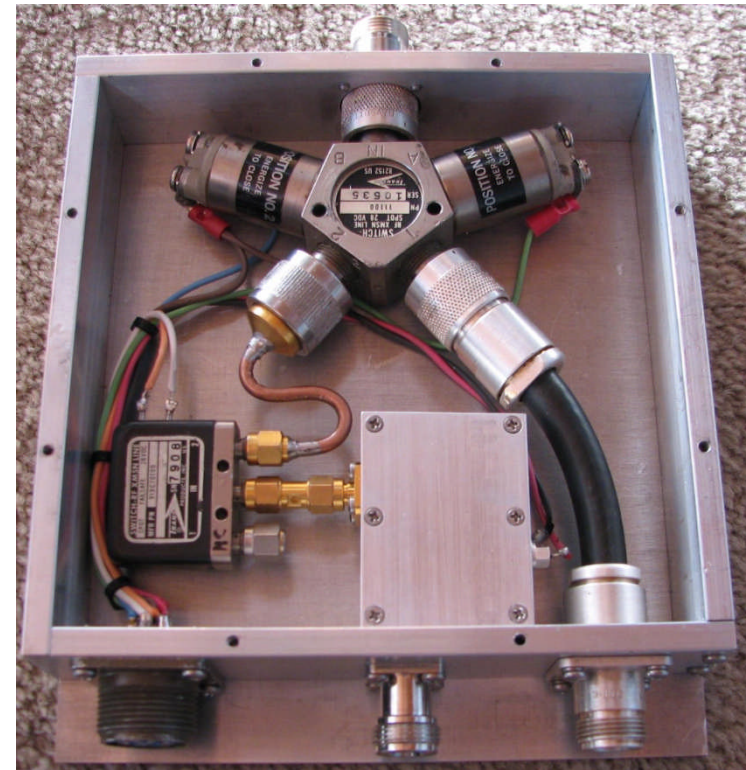
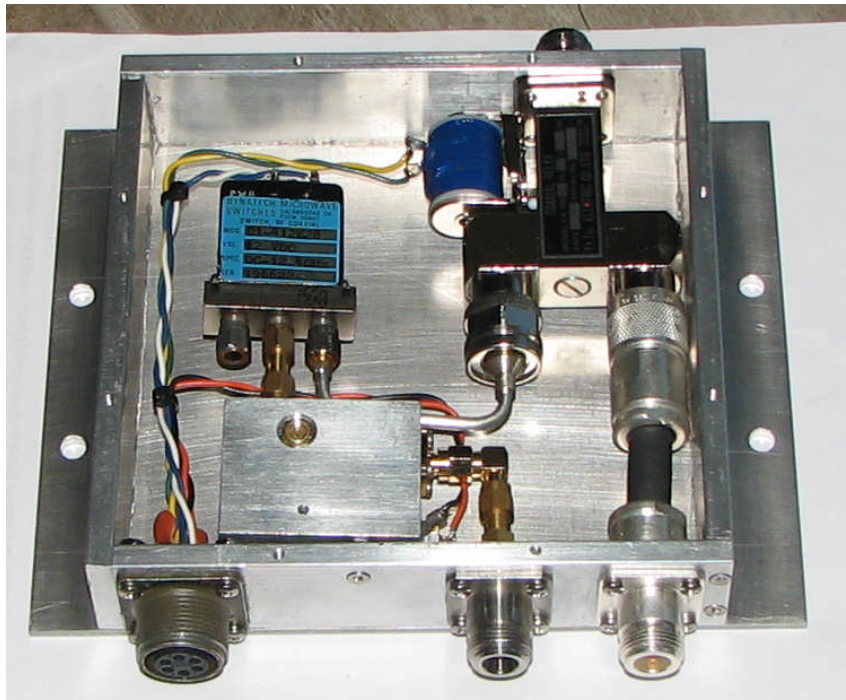
- Electric Burnishing of Contacts



# More Relays



# ENCLOSURES

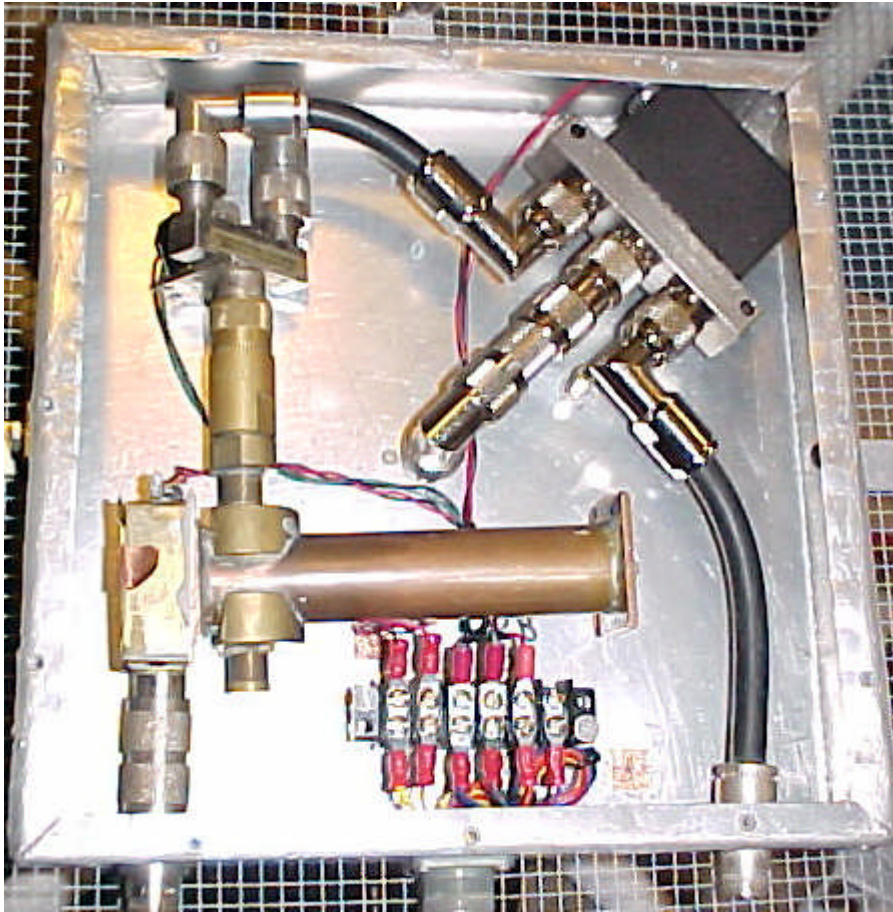


# ENCLOSURES

- FOCUS
  - ACHIEVE LOWEST LOSS AHEAD OF LNA AS POSSIBLE (ALTHOUGH I CHOOSE TO USE AN ISOLATION RELAY)
  - MINIMIZE SIZE AND WEIGHT
  - MAXIMIZE WEATHER RESISTANCE
    - Weep holes?
    - Silicone sealer

# ENCLOSURES

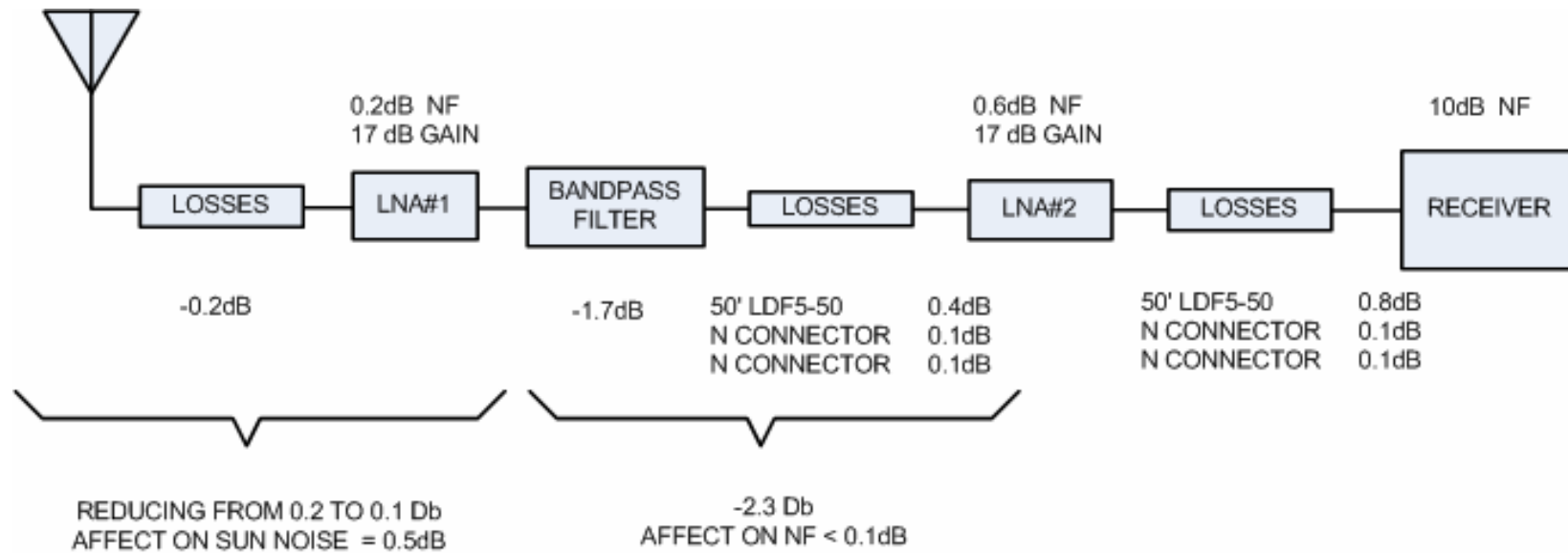
- MY 432 MHz System



LNA NOISE FIGURE = 0.17dB

OVERALL NOISE FIGURE = 0.37dB

# NOISE FIGURE (OF MY SYSTEM)



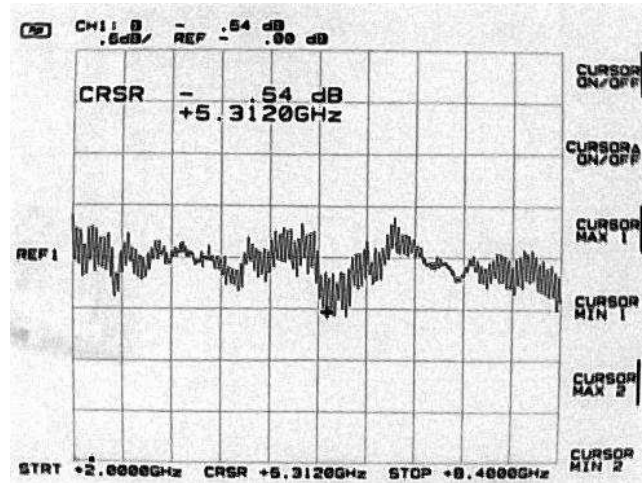


# CONNECTORS

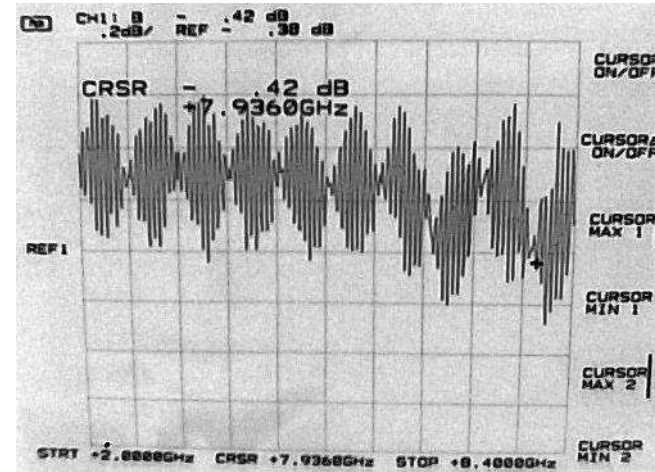


# CONNECTORS

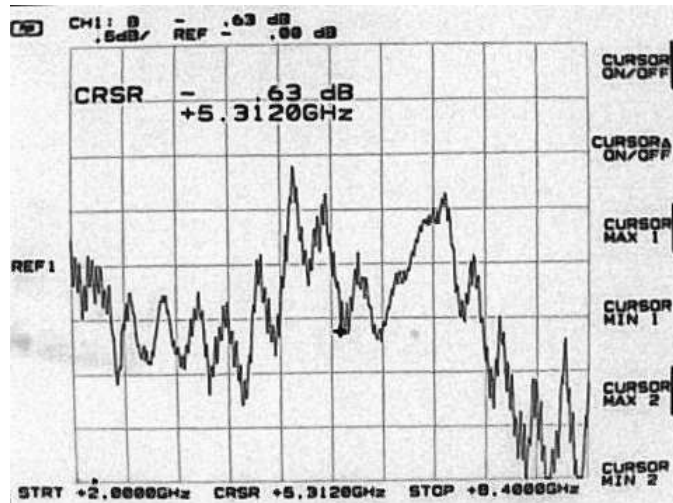
#3



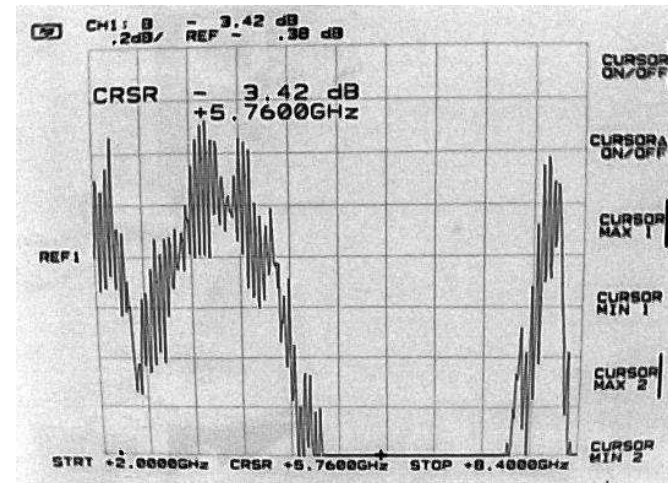
#5



#4



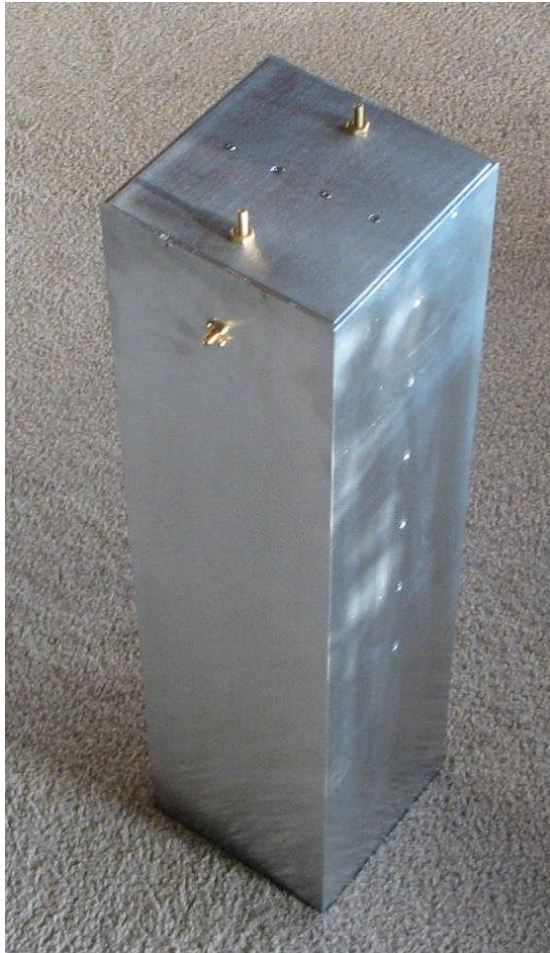
#6



# CONCLUSION

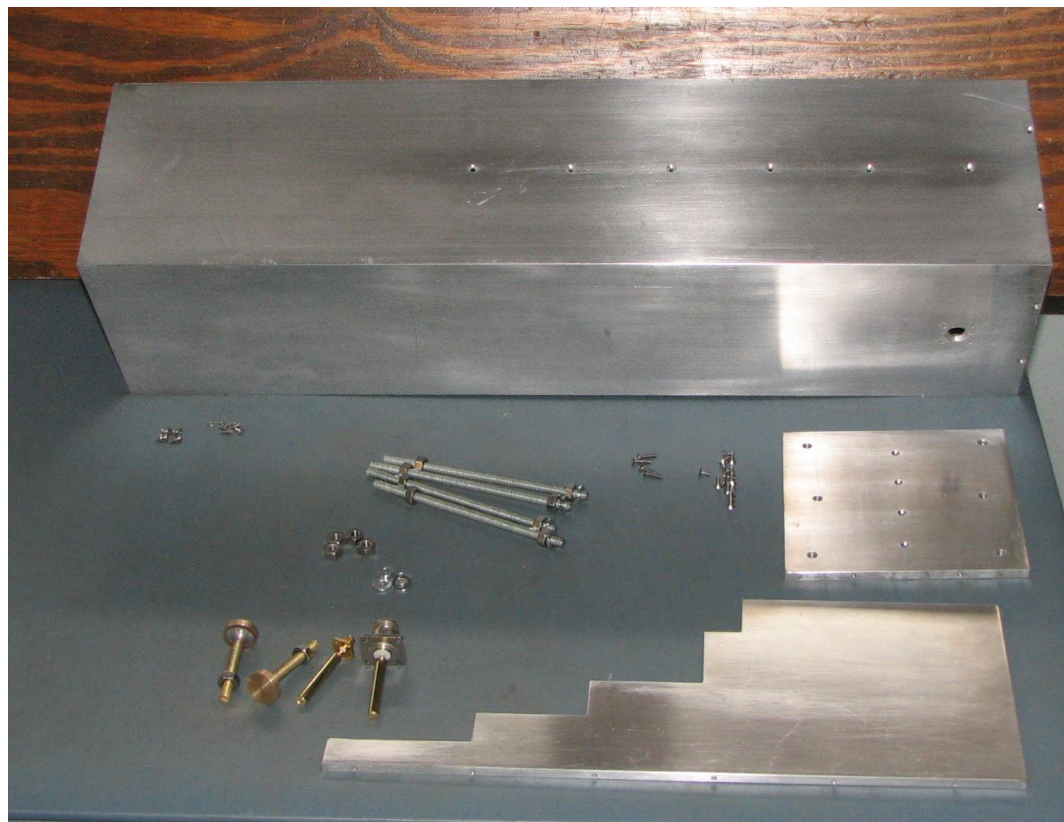
- This has been a collection of my experiences.
- I hope it has been of some benefit to you.
  
- Questions?

# A NEW TECHNIQUE FOR CONSTRUCTION OF 23CM SEPTUM FEED



# COMPONENTS

Key component is 6" square tubing from On-Line Metals  
(see link at <http://ptt-ak.com>)



# MOUNTING



# CLOSE UP



# COMPARISON

- Easier to construct than sheet metal square septum feed or VE4MA feed
- Easy to tune by adjusting both probes for best VSWR
- Good circularity with no adjustments (versus labor intensive polarizer screws)
- When scalar ring is added, and the feed is compared with a VE4MA feed on a 22 ft. dish, only 0.3dB less sun noise (W5LUA & K5GW, August 2005).
- Material cost less than \$75 (Less than \$100 with shipping)



# CONCLUSIONS

- See for yourself
- I brought one with me
- Detailed construction instructions in the proceedings