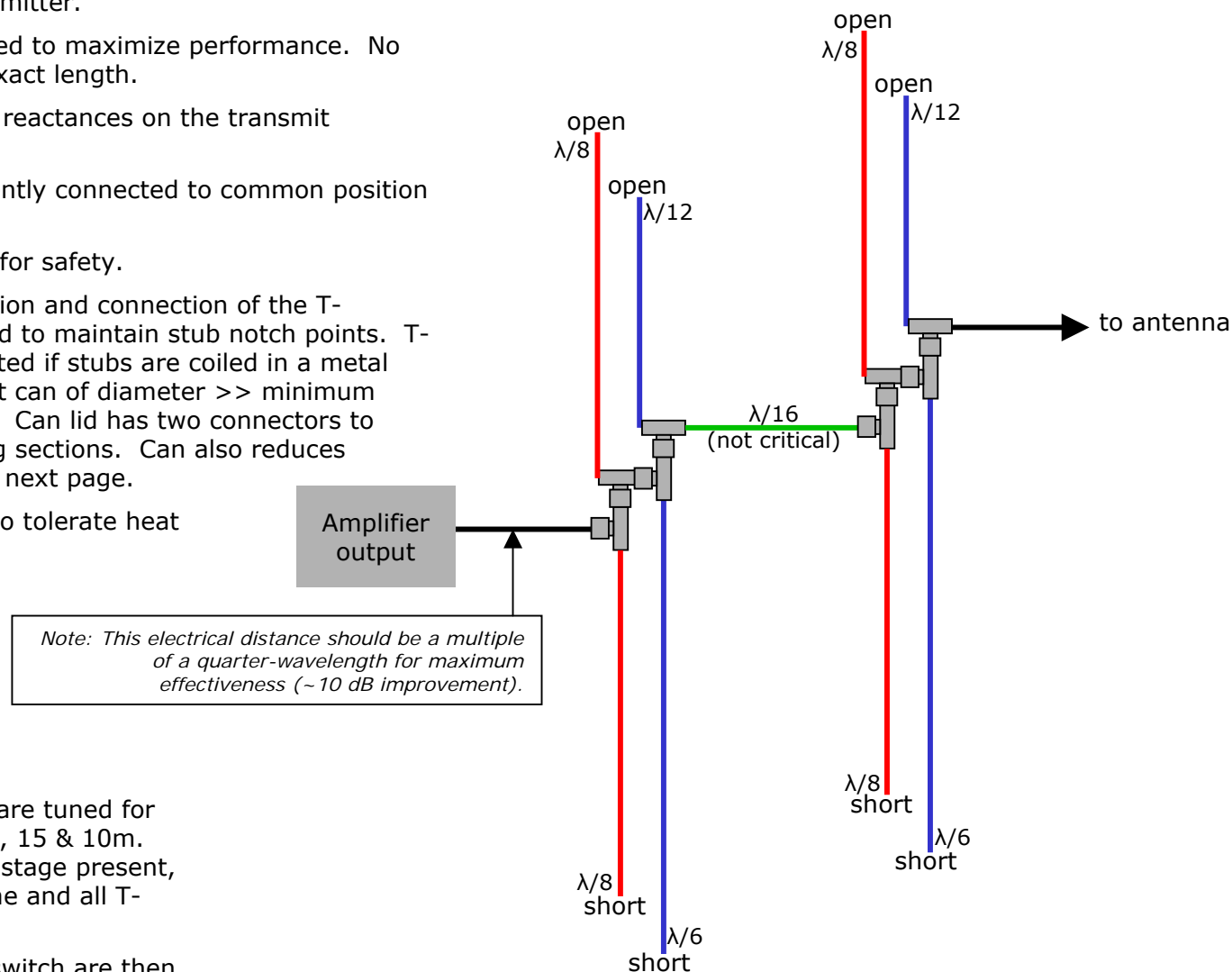


# Stub sketch notes

1. Red lines are even harmonic stubs.
2. Blue lines are odd harmonic stubs (nulls 15m). These are needed only on 40m transmitter.
3. Green coupling line required to maximize performance. No need to tune this line to exact length.
4. Within each stub pair, the reactances on the transmit frequency cancel out.
5. Stubs can be left permanently connected to common position of an antenna switch.
6. Shrink wrap each stub tip for safety.
7. Note carefully the orientation and connection of the T-connectors; this is required to maintain stub notch points. T-connectors can be eliminated if stubs are coiled in a metal container; e.g., large paint can of diameter  $\gg$  minimum bending diameter of coax. Can lid has two connectors to attach jumpers or coupling sections. Can also reduces radiation from stubs. See next page.
8. RG-213 or larger needed to tolerate heat from 1.5 kW.

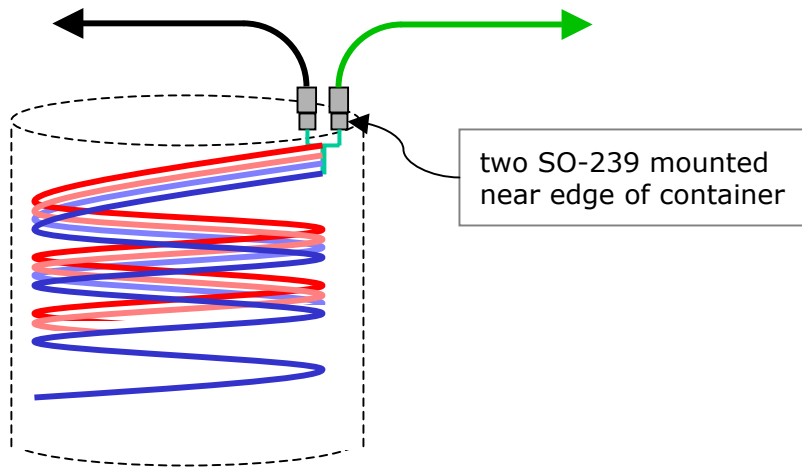


## Tuning:

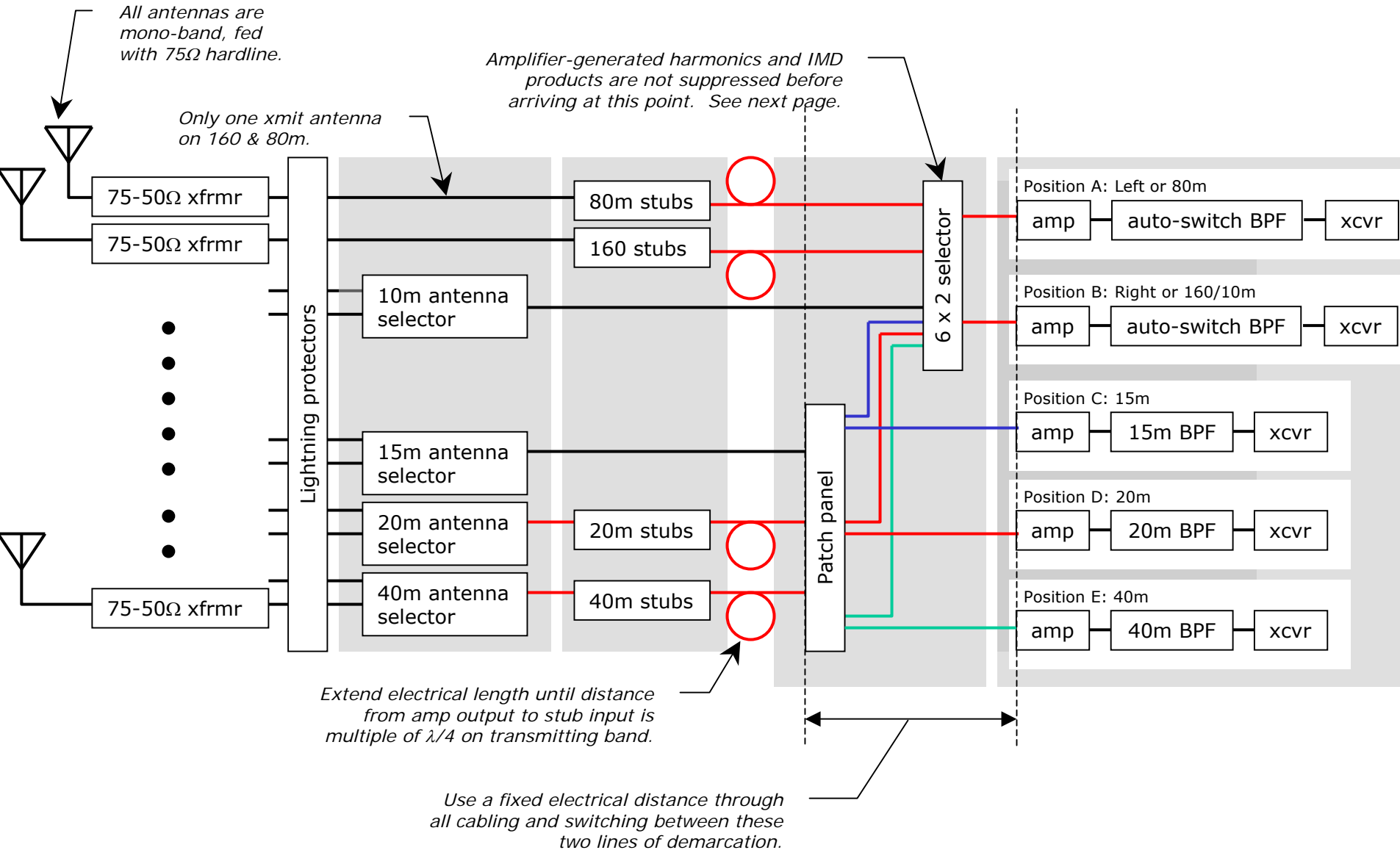
1. Stubs closest to amplifier are tuned for nulls in CW segment of 20, 15 & 10m. Tune without second stub stage present, but with green coupling line and all T-connectors attached.
2. Stubs closest to antenna switch are then installed and tuned for nulls near SSB portion of 20, 15 and 10m.
3. Should yield -60 dB rejection or better across harmonically related bands.

All lengths are electrical lengths on the transmitting band.

# Stubs in shielding container



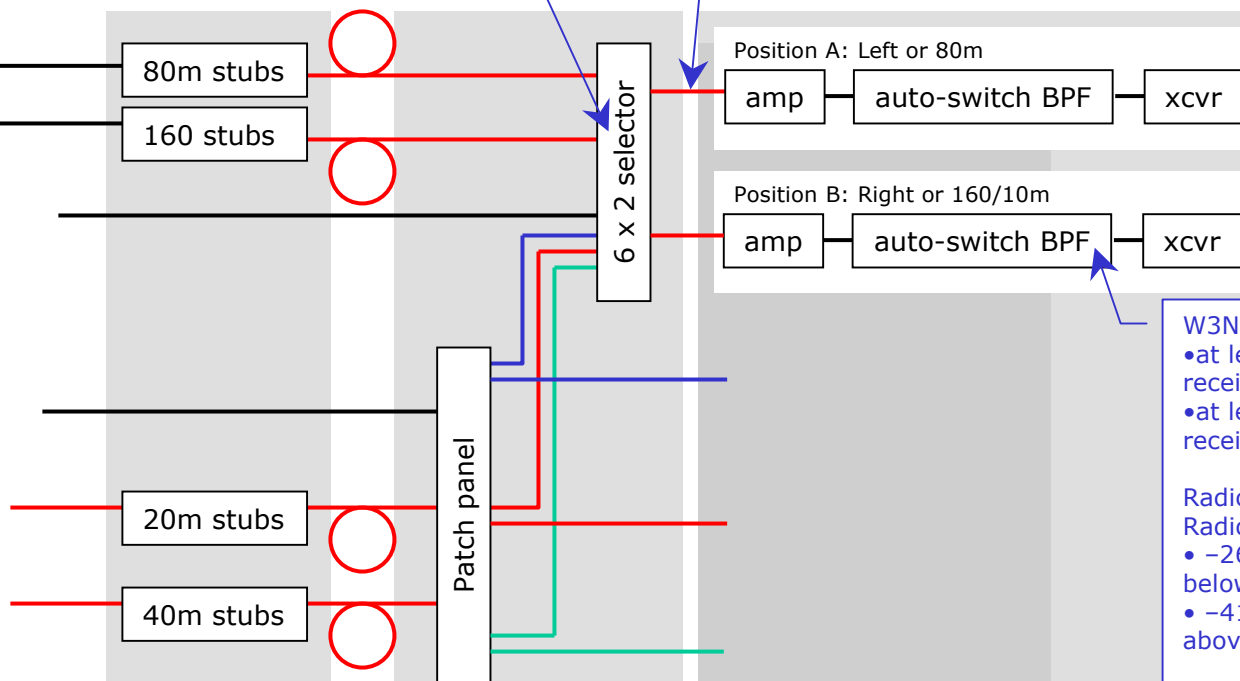
# RF cabling: overview of W1KM SO2R/MM configuration



# Harmonic power budgets in SO2R 6x2 single-box switch matrix

Array Solutions 2x6 matrix:  
 •worst case isolation = -58 dB.  
 Leakage Radio A to Radio B:  
 carrier: +4 dBm = S9+78 dB.  
 harmonic: -46 dBm = S9+27 dB.

1.5 kW amp  $\pi$ -L output network:  
 harmonic output =  
 -50 dBc  
 +12 dBm = S9+85 dB



W3NQN out-of-band rejection:  
 •at least -30 dB for bands below receive frequency.  
 •at least -45 dB for bands above receive frequency.

Radio A carrier power leakage into Radio B:  
 • -26 dBm or S9+47 dB for band below receive freq; this is safe.  
 • -41 dBm or S9+32 dB for bands above receive freq; this is safe.

*Note: ICE filter specs 15 dB worse.*

*Note: In-band harmonic will not be rejected further by BPF. Resulting signal S9+27 dB.*

# Harmonic power budgets in 6x2 non-integrated switch matrix

