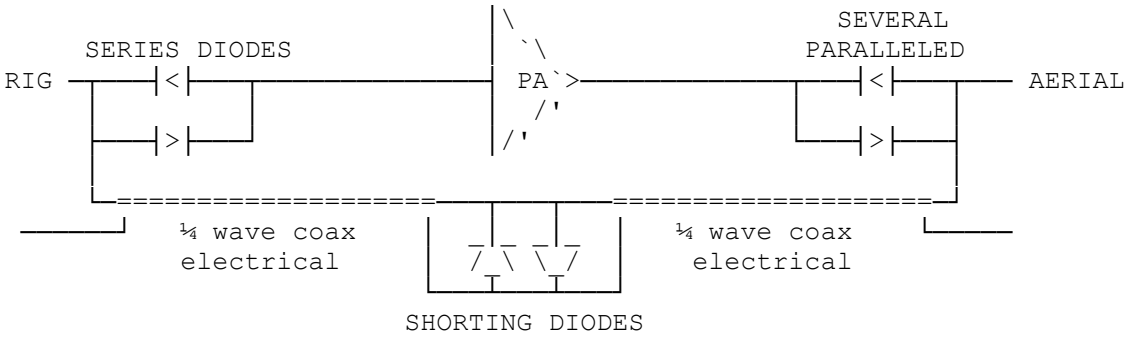
Non relay instant RF Switching

By G8MNY (Updated Oct 05)

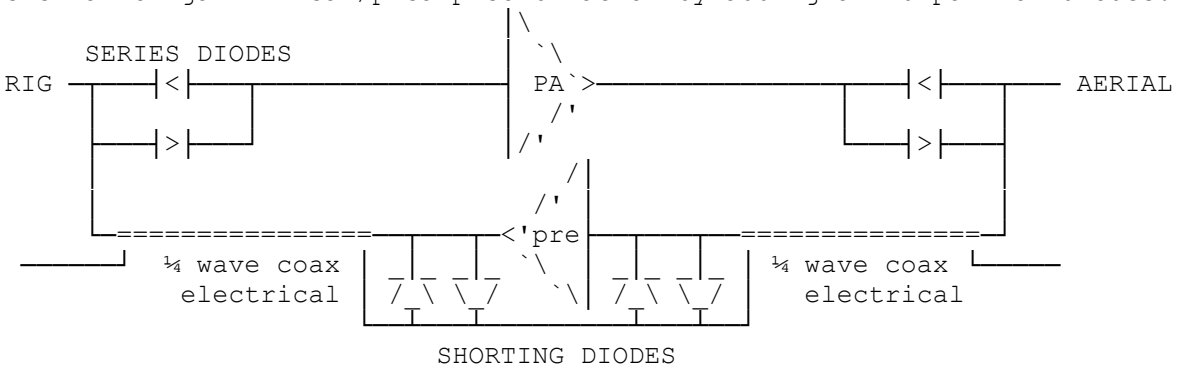
(8 Bit ASCII Graphics use code page 437 or 850)

Coax lines to do the RF switching. The advantages are instant switching no power wasting DC control circuits.



This is the standard circuit. RF Diodes (1N4184 or better) connect the PA when the drive is > 600mV & drive the aerial through diodes as well, these may need paralleled diodes for > 10W. In Tx the Rx path is short circuited by the diodes a ¼ wave from both the Rig & aerial, therefore presenting high Z to both.

It can also be used was is PA & preamp if it is non linear FM PA & possibly even a low gain linear/preamp combination by adding a 2nd pair of diodes.



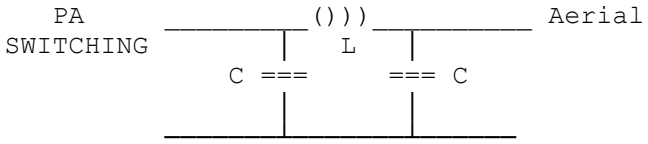
To find the electrical 1/4 wave length in your coax see 1/4 WAVE PASS below.

Although this design is really for FM/CW, the power lost in the diodes as a % of the total signal is very small. e.g. +/- 1V Peak in say 33V peak for a 10W PA or 70V peak for a 50W PA signal. This will cause spreading & crossover type distortion on SSB modes, but this additional distortion may be very small compared to the typical 6V of distortion or -22dB 3rd order IP of a 50W PA!

FILTERING IMPROVEMENTS

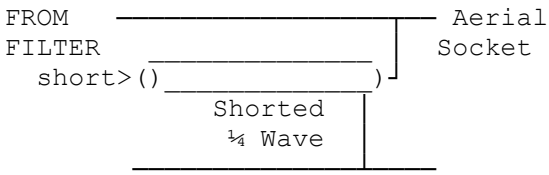
Some disadvantages are, that a large signal can crossmod on Rx due to the diodes, & on Tx there will be small levels of odd harmonics generated.

L.P.F. The Tx harmonics & higher out of band Rx frequencies can be filtered with a low pass filter "pie section filter" before the aerial. This will attenuate signals @ 18dB/Octave above the cut off frequency.



For 2M C=23pF & L=1-3 turns 1cm dia to give a SWR 1:1 match into a good load.

1/4 WAVE PASS. Further improvement can be made with a electrical ¼ wave of coax teed to the aerial socket & shorted at the other end. This will reduce even harmonics from the Tx & reduce some of the out of band crossmod signals on Rx. It also provides a jolly good DC short to aerial static!



Start with slightly longer piece of coax than a ¼ wave x coax Velocity Factor. e.g. 48cm. Tee this across the aerial socket & leave open circuit. With a good aerial & Rx connected, cut down the coax length a bit at a time to null out a Rx signal. Check the null is good with the coax in it final position (around the PA etc). Then without shortening the coax make cut into the inner insulation & solder up a short circuit.

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73 De John, G8MNY @ GB7CIP