

The Latest

Tunig of 10 GHz bandpass filter

Up

Posted by AG6QV Frank

Tags:

I've been building multiple pipe cap filters for 10 GHz and found that precision is key to make something that is easy to tune. I'm using M3 screws and nuts but even with one nut soldered to the top of the 1/2" pipe cap the thread is not stable enough to keep the screw from moving from side to side. W7GLF, Ray found a waveguide filter on eBay and I jumped on the listing and paid the \$85 plus tax. Today I received the filter to be used in my new 10 GHz rig.

The filter was listed as "Harris Farinon WG Filter 10 GHZ XMT 801-112556" but there was no frequency labeled on the filter and since there are 5 cavities I did not want to start moving them around without a system in place to avoid getting it completely out of tune.

10 GHz bandpass filter

When I inserted the filter in the 10GHz radio there was no viewable output on the spectrum analyzer and my HP spectrum analyzer, that covers 10 GHz, does not have a tracking generator. My Regol analyzer has a tracking generator but that only covers up to 1.5 GHz. I do not have a good signal generator that covers the microwave bands so that was not an option either. The solution is to use the 10 GHz transverter. It uses a LO Frequency of 10.224 GHz and would normally use an IF of 144 MHz. Instead of using an IF radio I used the tracking generator from the Regol spectrum analyzer. I started out with a bandwidth of 500 MHz and used the HP spectrum analyzer to determine the center frequency of the filter to be around 10.580 GHz. I then narrowed the bandwidth to about 20 MHz and moved the center frequency down 5MHz. I could then tune the filter to max signal through, then I could move the center frequency another 5-10 MHz down as long as I was able to see the signal I could tune the five cavities to maximum signal. By repeating these steps until the center frequency was close to the 10.368 GHz. Then I removed the tracking generator and replaced the IF signal with the 144 MHz radio and performed another tune to maximum signal.

The image below shows the output of the mixer where the LO signal and the desired signal is shown.

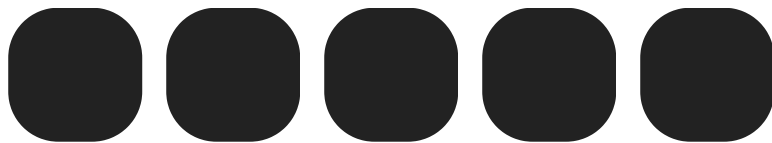
Signal before filter

And the signal at the output of the filter looks like this:

Signal after filter

Note how the amplitude of the desired signal is the same level before and after the filter. This is an indication of a very small insertion loss. I'm quite happy about the performance. Tuning the filter to the correct frequency was much easier than anticipated. Having a VNA or an SA with tracking generator that covers the desired frequencies would make it even easier, especially to get the pass band to be in the right position. Since we normally only use about 2 MHz of bandwidth it is easy to check the filter response by moving the frequency of the IF radio to the band edges.

Link to this Post



Microwave Contest May 2023

[Up](#)

Posted by AG6QV Frank

Tags:

The PNW Microwave group was out in the field, operating microwave equipment from 902MHz to 122GHz. This is a summary of the events. There are two contests today. The Microwave Spring from 8am to 2PM pacific time and the SBMS 2GHz & Up contest on both Saturday and Sunday. The day started with W7FY, John showing up at my QTH just after 8am. I was not quite ready and started out by making coffee and bringing out equipment. John traveled to a location 1.6 km south of my location to attempt 10 GHz and 122 GHz contacts. The 10 GHz contact was made quite easily with the short distance. The 122 GHz contact was not possible because of leaves on the trees in the path. A week ago the leaves was not as far along and it was possible to find a path trough the trees. John returned to my back yard and W7GLF, Ray showed up as well. WA4OSH, Konrad was on his way to Vashon to attempt a repeat of the test we did last weekend. It was an easy contact so John and Ray wanted to test their rigs with horn antennas and was able to connect with Konrad without any problems. We also mad contact between the 3 of us in the back yard on both 10GHz and 122GHz. These contacts does not give any distance points but in the SBMS contest we each get 100 points for the fist contact with each station on each band :-)

WA4OSH mad his way back to the ferry terminal where we tried another contact on 10 GHz. As shown on the image below we did not have a clear line of sight:

Vashon Burien 10 GHz

I noticed the ferry was leaving the terminal so I asked Konrad to point his antenna in that direction and we were able to work each other with 59 signals in both directions. Ferry scatter is a thing. They do not move as fast as airplanes :-)

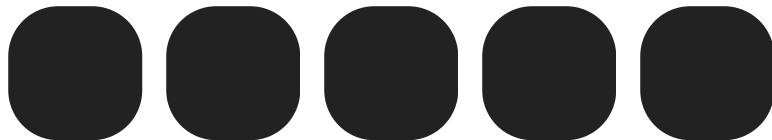
Konrad moved on to the Olympic peninsula where we made a final contact from Manchester to Burien ~16km distance. We are slowly increasing the distances while getting used to the new equipment and how to operate on the microwave bands. W7GLF, Ray had moved to the south beach to operate to lower frequency bands with bounces off of Mt. Rainer. I was listening from my shack on an indoor antenna and was able to hear Ray on the back of his beam. It was only 1.6 km away and I'm only running 10W on 1296 MHz but we gave it a try and was able to complete a QSO on SSB, using the home made ZigZag antenna shown below.

1296 MHz Zig Zag antenna

Finally I moved to the south beach where Ray was setting up his 10 GHz station. My station is very portable and after a few minutes I was ready to try a contact with KD7UO, Dale. He started out by sending CW beacon towards Mt. Rainer and I was able to find his signal and point my antenna towards maximum signal strength. We then switched to SSB and was able to hear each other with 55 signals in both directions. The mountain was not visible today, but 10GHz radio wave did not have any issues coming through.

10GHz contact via Mt. Rainer

Link to this Post



MRF 300 HF/6m Amp

Posted by AG6QV Frank

Tags: [HAM](#) | [HF](#)

Up

I'm living in a forest with a tool hill of trees to the east, north and south. The 30-50W I use when operating FT8 will usually result in a 10 - 20 dB difference in signal received vs sent. So I figured I would increase the output a bit to perhaps 100 or 150W when operating FT8 and 600W for SSB/CW. The MRF 300 transistors are relatively cheap (\$52 per transistor) and boards are available assembled or as a kit for about \$100. I decided to go with a board from [DX World-e](#) in Greece. Today I started on mounting the components into a small box.

The image below shows the top half of the cabinet with the amp, TX relay and connectors for input and antenna 1 and 2 on the back.

Top 2

When the box is turned upside down the heatsink will sit on the top left and there is room at the bottom for the low pass filters and the front plate with switches and SWR instruments.

Front

The back of the cabinet has input and output as well as a place for the power cord to be attached. The bias circuit and relays require 12V and the MRF 300 transistors will operate on 52-57V to get to the full 600W power. I have not yet decided if I want to use an external 12V source or build a step down converter and regulator from the 54V line.

Back

There is still a bit more work until I can power it up and after that there is a similar version for 2m to put into a second enclosure.

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