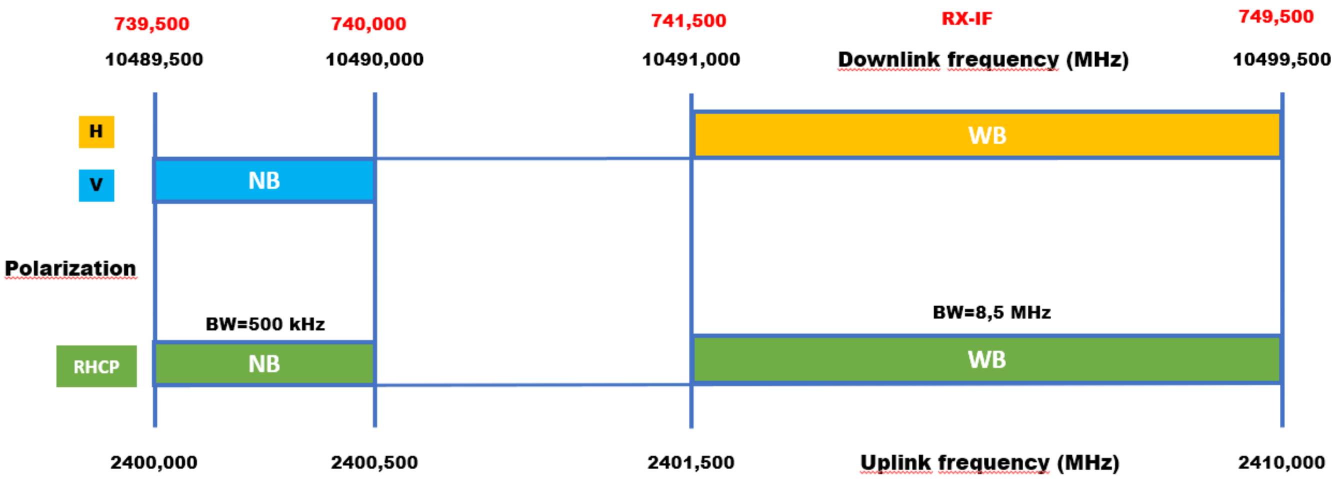
UHF bandpass filter retuned as RX IF filter for the QO-100 satellite

Matthias, DD1US, September 1st 2024

Some time ago I bought UHF bandpass filter. The filter is from a company Blonder Tongue Laboratories based in New Jersey/USA. It features F-jacks at its input and output and is housed in a weather proof outdoor encasing which can be mounted to a mast.

As I have been looking for an IF filter for my QO-100 setup I decided to retune the filter for an IF of 744.5MHz. This IF results when using an unmodified LNB with a local oscillator of 9750 MHz and receiving the QO-100 satellite around 10494.500 MHz. The downlink frequencies of QO-100 are in the frequency range 10489.500 MHz to 10499.500 MHz which result in IF frequencies of 739.500MHz zo 749.500MHz. The center of the downlink IF is thus 744.5MHz. Many receivers such as TV tuners and SDRs are sensitive to strong out of band interference and this can bs suppressed by adding a bandpass filter in the IF path before feeding the received signal to the receiver. There have been reports about some SDR receivers creating problems because of receiving other transponders at the same direction as QO-100. The SDRs did receive them at twice the intended IF frequency. This can be easily suppressed by a suitable bandpass filter.



Here are some pictures of the filter:

Adapters from F to SMA have been attached to the filter for the measurements.

The aluminium encasing can be mast mounted

A bracket for mast mounting is included

These are the mounting instructions which came with the filter:

BLONDER·TONGUE LABORATORIES INC. MADE IN USA

UHF-BPF

Part Number 8088 (4805)

Single Channel UHF Bandpass Filter

INSTALLATION INSTRUCTIONS

651105400A

DESCRIPTION

UHF-BPF filters pass a single UHF TV channel and attenuate all others. Three stage, high Q circuit design with silver plated interior surfaces and parts render a flat 6 MHz bandpass and low-on channel through-loss. The unit's small size plus aluminum construction permit the unit to be mounted indoors or outdoors. Mounting hardware is supplied with each unit.

INSTALLATION

The UHF-BPF is designed to mount on a flat surface or on an antenna mast. Two screws are provided to mount the unit to flat surfaces. The U-bolt, U-bolt bracket, and wing nuts are used to mount the unit to a mast.

Mast Mounting

Position the U-bolt around the mast and through the mounting bracket as shown in Figure 1. Position the UHF-BPF's mounting bracket between the U-bolt and the mast and tighten the wing nuts.

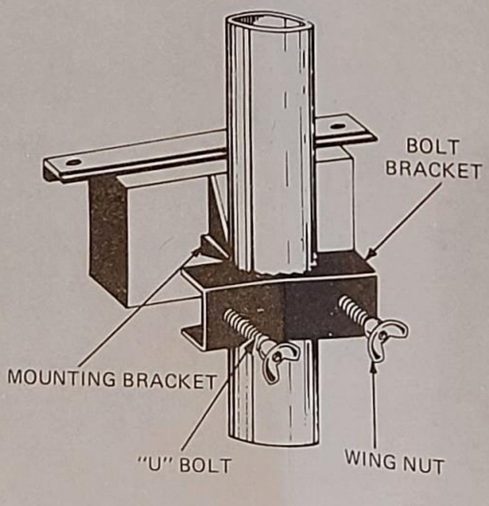


Figure 1

ONE JAKE BROWN ROAD, OLD BRIDGE, NEW JERSEY 08857

Wall Mounting

Secure "A" bracket to the wall with the two screws supplied (see Figure 2).

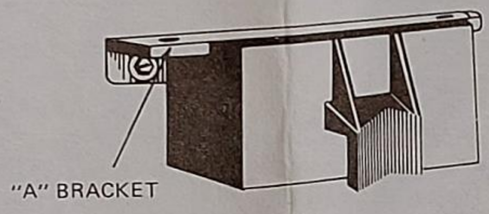


Figure 2

Ceiling Mounting

Secure the "B" bracket to the ceiling with the two screws supplied (see Figure 3).

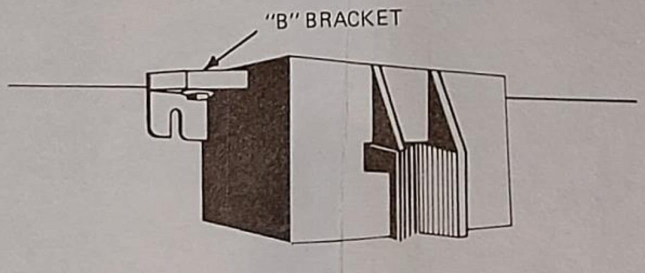
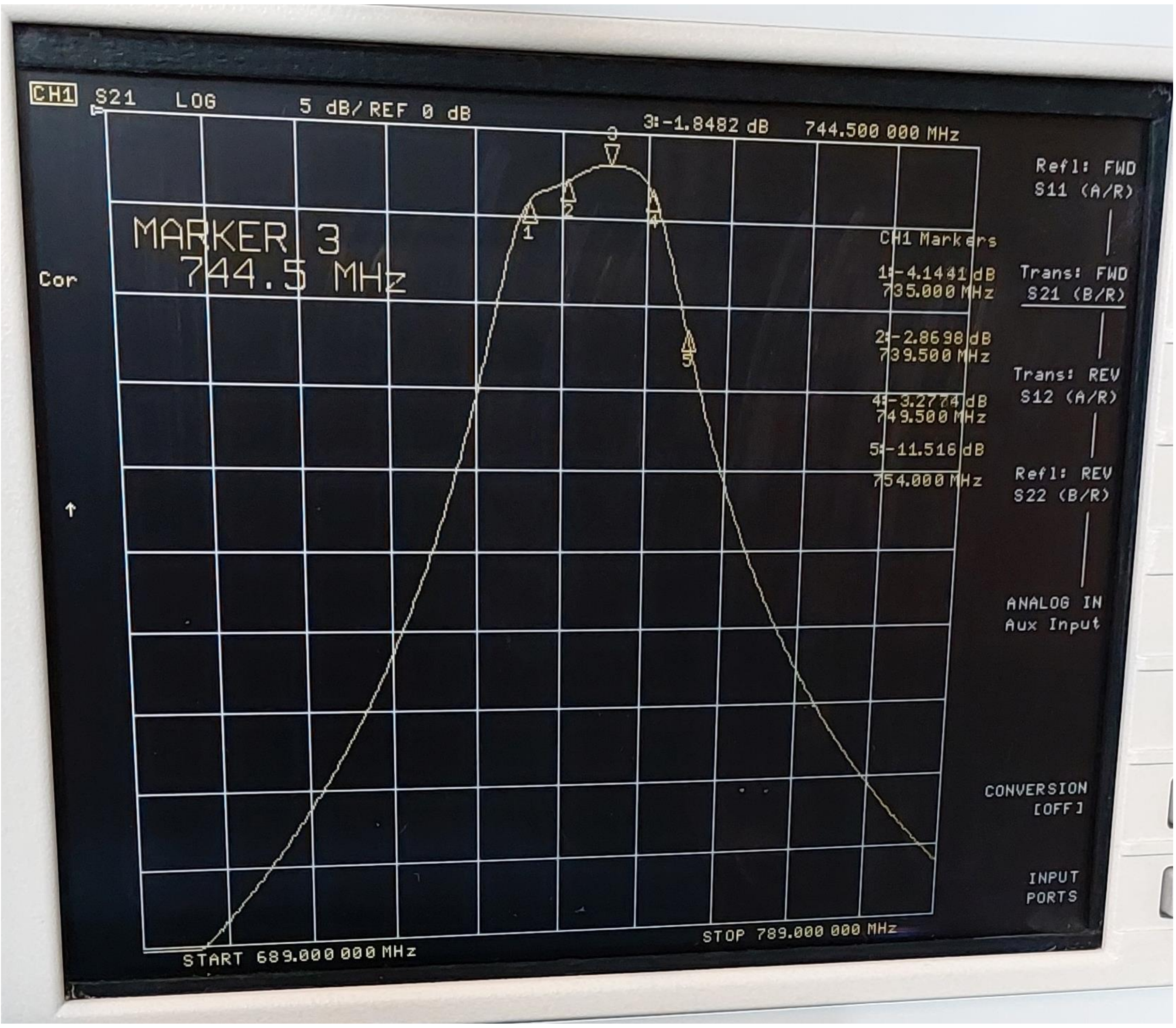


Figure 3

wp 1568

The filter features three high quality trimmer capacitors which are accessible without opening the encasing by simply unscrewing their brass caps.

After the retuning of the filter to a center frequency of 744.500 MHz the following S21 characteristic was measured (please note that the filter has a nominal impedance of 75 Ohms and was measured “brute force” in a 50 Ohm measurement system without using impedance matching transformers).



S21 log mag: insertion loss about 1.8dB @744.5 MHz

In summary this filter makes a perfect IF filter for the receive path of a QO-100 station covering both, the narrowband and the wideband transponder. The measured insertion loss at 744.5 MHz is 1.8dB. It is certainly below 3 dB in the complete passband when used I a true 75 Ohm system. As the preceding LNB typically has very high gain (typ. more than 50dB) this is more than adequate.

I always appreciate feedback and will be happy to answer questions. Please send them to the Email address given below. Many thanks in advance.

Best regards

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