RGO ONE Variable bandpass crystal filter – 4 pole Johnson type

Operating manual version 1.01b

RGO ONE has a neat option - 4 pole crystal filter which bandwith is controlled via varactor diodes. Firmware generates proper voltage bias and this manner realize 10 fixed filters - 3kHz down to 220Hz.

Variable bandwith function is activated with short press of FLT button on the front panel. Then rotating encoder 1 (PWR) controls receiver bandwith.

VBF is positioned in IF path right after first 9MHz (3kHz bandwith) roofing filter and first IF amplifier – board IF/AF, U1 GALI74. Since this is receive path it will act only on receive. If not engaged the signal passes thru 6db attenuator pad in order to equalize receiver gain in both cases (VBF-ON/VBF-OFF).
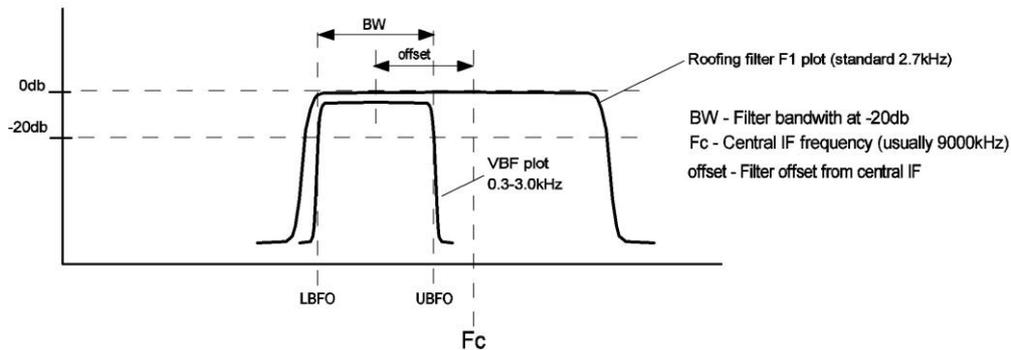
First roofing filter must always cover up and envelop the second crystal filter (VBF) in order to minimize the loss in VBF. Nevertheless a significant signal loss is observed when narrowing the filter bandwidth. This is normal as the receiver AGC response depends on incoming signal which in crowded HF bands consist of heavy atmospheric and other (QRM and manmade) noises.

When choosing the bandwith from B01 to B10, RGO ONE firmware instantly reschedule LO/BFO frequencies in order to keep up current mode side band and CW settings and main frequency which is visualized on the display. Also selected pitch on CW remains unchanged. MENU functions 25 – 30 are intended to keep VBF characteristic and this way LO/BFO frequencies to be assigned when different filters are chosen by the operator.

Specifications:

- Filter bandwith @-3db $220 \div 2120$Hz
- Offset from 9MHz IF $-60 \div -1160$Hz
- Shape factor -6db/-60db   N.A.
- Input/output impedance 50Ω

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Optional VBF Johnson filter chart

Uopf,V	BW/-20db, Hz	offset, Hz	Filter selection on display	MENU 29, 30
1.0	460 $^{220/-3db}$	-1160	B01	FB
2.0	600 $^{360/-3db}$	-1080	B02	
3.0	960 $^{560/-3db}$	-940	B03	
3.4	1080 $^{680/-3db}$	-860	B04	MENU 27, 28
4.0	1400 $^{880/-3db}$	-760	B05	FA
4.5	1660 $^{1100/-3db}$	-620	B06	
5.0	1920 $^{1260/-3db}$	-500	B07	
5.4	2240 $^{1520/-3db}$	-360	B08	
5.9	2620 $^{1760/-3db}$	-200	B09	MENU 25, 26
6.5	3100 $^{2120/-3db}$	-60	B10	F2

Notes:

Assign filter parameters for B01, B05 and B10 in respective MENU entries

Offset parameter might be adjusted a little in order equal spectrum
on LSB/USB; CW/CW-R to be heard

Three filter settings are needed for the firmware to realize all 10 fixed filters. These settings consist of bandwith and offset from center IF (for RGO ONE it is 9MHz). According to operators listening preferences – these settings might be slightly re-adjust, especially offset frequency in order to obtain equal audio sounding on opposite modes – LSB/USB; CW/CW-R.(Long press of MODE button)