

Apache Labs ANAN-100 and ANAN-100D

OpenHPSDR-PowerSDR SETUP MENU

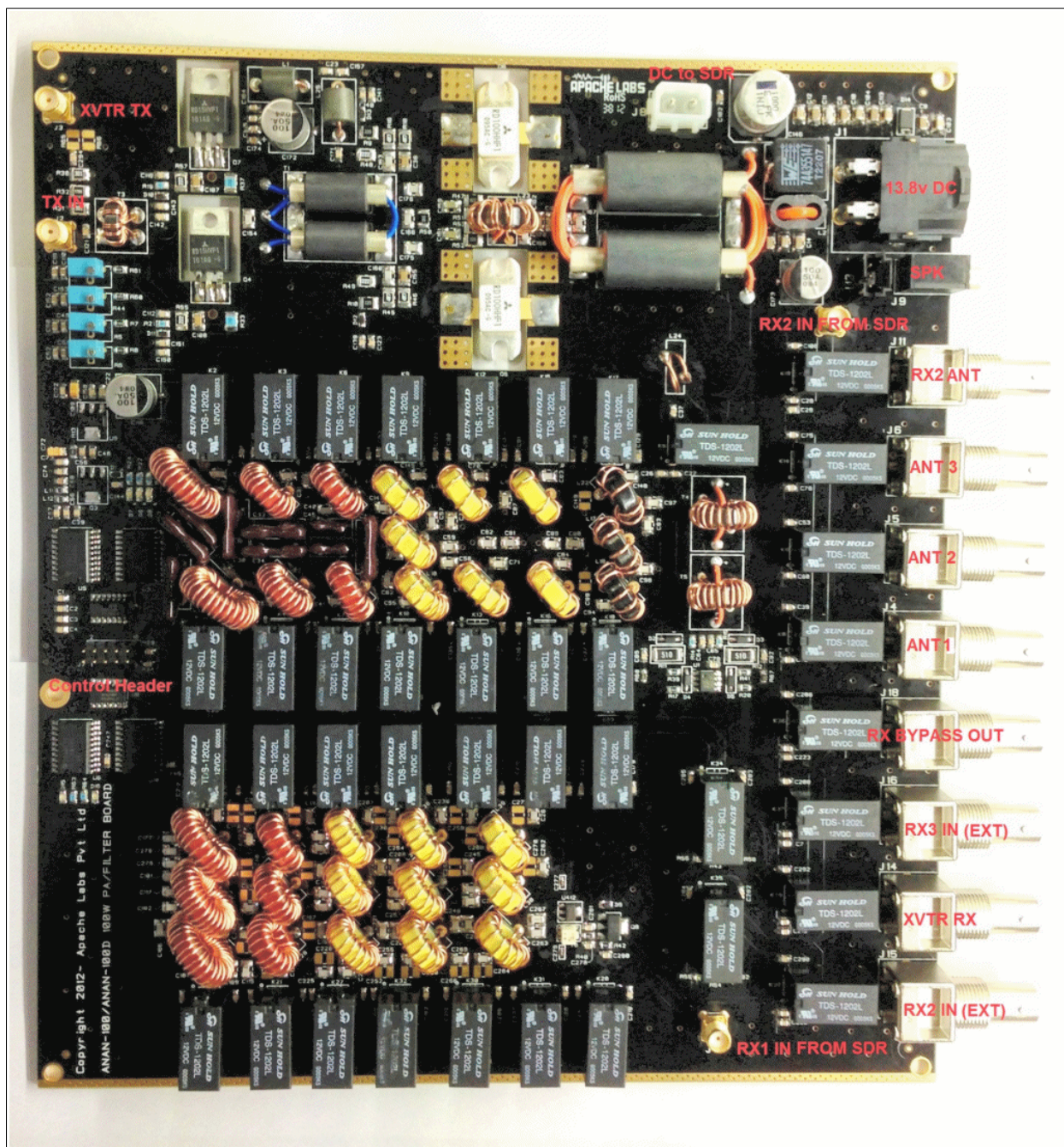
Antenna/Filters board configuration

Table of Contents

Introduction.....	3
PA/Filter board.....	3
The primary functions of the PA/Filter board:.....	4
High pass and Low Pass filters on the PA/Filter board are NOT software defined.....	4
Low Pass Filters are used for both transmit and receive filtering.....	4
High Pass Filters are used for receive only.....	4
6 HPF ranges and 7 LPF ranges.....	5
actual HPF and LPF cutoff frequencies are fixed in hardware.....	5
Auto/Manual switch.....	6
Filter Bypassing.....	7
allow the user to bypass selected HPF, or to bypass.....	7
6 Meter BPF/LNA Operation.....	8
US Military Auxiliary Radio System (MARS) operation.....	9
“Region” can be changed from “United States”.....	9
Licensed 470-479 Khz / 630 meter operation.....	10
Operation in the 470-479 khz / 630 m band REQUIRES an external low pass filter.....	10

Introduction

The Apache Labs ANAN-100 and ANAN-100D SDR Transceivers both use the same PA/Filter board



The PA/Filter board is installed upside down on the top inside of the ANAN-100/D case / extrusion. The case is used as a heat sink for the PA Driver and PA Final transistors.

The primary functions of the PA/Filter board:

1. 100 Watt Power Amplifier.
2. High pass filtering.
3. Low pass filtering.
4. Watt meter/SWR capabilities.
5. Antenna selection capabilities
6. Filter selection capabilities.
7. 0,10, 20, 30 db step attenuator.
8. Transmit/Receive switching relays.

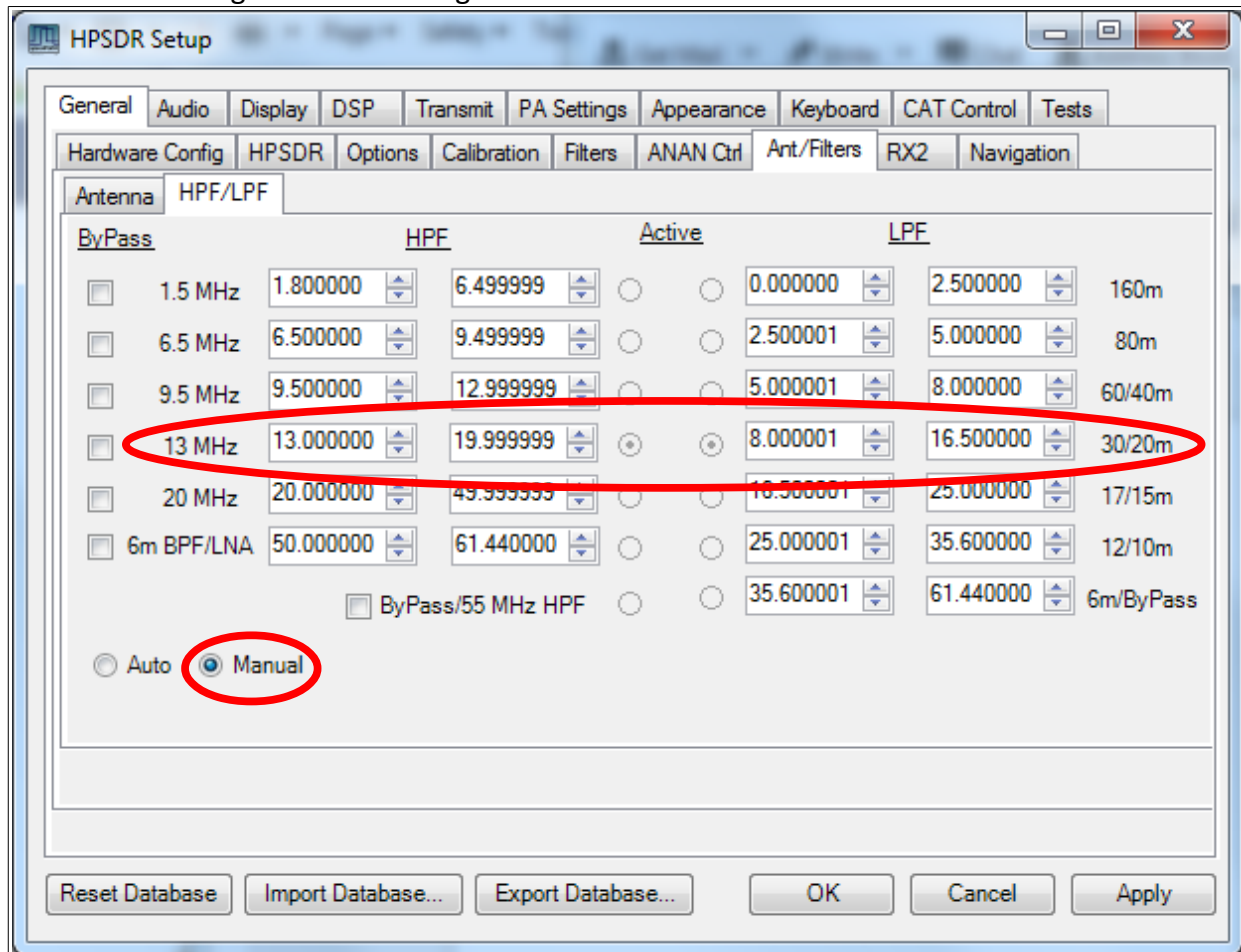
With the exception of the 100W power amplifier, the PA/Filter board is based on the OpenHPSDR "Alexaires" (Alex) design.

See http://svn.tapr.org/repos_sdr_hpsdr/trunk/Alexiares/Documentation/ALEX Manual V1.0.pdf to view the OpenHpSDR Alexaires V1.0 manual.

The High pass and Low Pass filters on the PA/Filter board are **NOT** software defined. These use discrete capacitors and inductors to create hardware based filters with specific Low Pass and High Pass characteristics. The actual filter frequencies **CANNOT** be modified by the user.

The Low Pass Filters are used for both transmit and receive filtering, but their primary function is to prevent radiation of transmitter harmonics. The High Pass Filters are used for receive only and are used in conjunction with the Low Pass Filters to create bandpass filters, according to the VFO frequencies currently in use.

The PowerSDR Setup, Ant/Filters, HPF/LPF tab contains apparent settings for 6 HPF ranges and 7 LPF ranges.



For example, when a VFO is set to 14.300 Mhz, PowerSDR will select the 13Mhz High Pass filter and the 30/20m Low Pass filter. This creates a receive bandpass filter with a bandpass of 13 Mhz (High Pass) to 16.5 Mhz (Low Pass). When transmitting, only the LPF is used to suppress any emissions above 16.5 Mhz or so.

While PowerSDR provides spinners which **appear** to allow you to change the apparent Low Pass and High Pass cutoff frequencies, the **actual HPF and LPF cutoff frequencies are fixed in hardware** and **CANNOT** be changed by the user. The spinner value settings are used by PowerSDR to determine **when to select particular filters** based on present VFO settings, but do **NOT** affect the actual HPF and LPF cutoff frequencies defined in hardware.

The HPF/LPF tab also contains an Auto/Manual switch. When switched to manual, individual HPF/LPF filter selections are shown for the current VFO frequencies. When in Auto mode, the HPF/LPF filter selections shown will likely not be correct and may represent the state of the filters the last time the manual button was pressed.

When one or more HPF are bypassed, the bypass is **ONLY** active when the Auto / Manual switch is in the **MANUAL** mode. VFO frequency also can affect when individual HPF are active in manual mode.

Note that the "ALEX" button in the upper left corner of the main PowerSDR window toggles between Alex HPF/LPF auto and manual mode with a mouse click.



ALEX in Manual Mode



ALEX in Auto Mode

Filter Bypassing

The HPF section contains check boxes to allow the user to bypass selected HPF, or to bypass all HPF. LPF filters cannot be bypassed, since they are used to prevent transmission of unwanted harmonics etc. The Bypass check boxes **ONLY** work when in Alex HPF/LPF **Manual** mode. The bypass check boxes do **NOT** function in Alex Auto mode.

Antenna		HPF/LPF		ByPass		HPF		Active		LPF		
<input type="checkbox"/>	1.5 MHz	1.800000	6.499999	<input type="radio"/>	<input type="radio"/>	0.000000	2.500000		160m			
<input type="checkbox"/>	6.5 MHz	6.500000	9.499999	<input type="radio"/>	<input type="radio"/>	2.500001	5.000000		80m			
<input type="checkbox"/>	9.5 MHz	9.500000	12.999999	<input type="radio"/>	<input type="radio"/>	5.000001	8.000000		60/40m			
<input type="checkbox"/>	13 MHz	13.000000	19.999999	<input type="radio"/>	<input checked="" type="radio"/>	8.000001	16.500000		30/20m			
<input type="checkbox"/>	20 MHz	20.000000	49.999999	<input type="radio"/>	<input type="radio"/>	16.500001	25.000000		17/15m			
<input type="checkbox"/>	6m BPF/LNA	50.000000	61.440000	<input type="radio"/>	<input type="radio"/>	25.000001	35.600000		12/10m			
		<input checked="" type="checkbox"/>	ByPass/55 MHz HPF	<input checked="" type="radio"/>	<input type="radio"/>	35.600001	61.440000		6m/ByPass			
		<input type="radio"/>	Auto	<input checked="" type="radio"/>	Manual							

The above picture shows Alex HPF/LPF in Alex **manual** mode with “ByPass/55 Mhz HPF” checked. This bypasses **all** HPF, but does **NOT** bypass the automatically selected LPF. The “ByPass/55 Mhz HPF” checkbox, when checked, is **ONLY** active when HPF/LPF is in Alex **manual** mode.

The “ByPass/55 Mhz HPF” checkbox, when checked, overrides any other HPF Bypass check boxes. In other words, when checked, all HPF are bypassed when in Alex manual mode.

6 Meter BPF/LNA Operation

The Alex HPF/LPF 6m BPF/LNA bypass check box controls both the 6 meter HPF and the operation of the 6 meter Low Noise Amplifier (pre-amp).

The screenshot shows the 'Antenna HPF/LPF' window. The 'ByPass' column has checkboxes for various frequencies. The '6m BPF/LNA' checkbox is unchecked. The 'Active' column has radio buttons. The 'LPF' column has frequency ranges and their corresponding HPF values. The '6m/ByPass' LPF is selected, showing a frequency range of 35.600001 to 61.440000 MHz. The 'Manual' radio button is selected.

ByPass	HPF	Active	LPF
<input type="checkbox"/> 1.5 MHz	1.800000	<input type="radio"/>	0.000000 2.500000 160m
<input type="checkbox"/> 6.5 MHz	6.500000	<input type="radio"/>	2.500001 5.000000 80m
<input type="checkbox"/> 9.5 MHz	9.500000	<input type="radio"/>	5.000001 8.000000 60/40m
<input type="checkbox"/> 13 MHz	13.000000	<input type="radio"/>	8.000001 16.500000 30/20m
<input type="checkbox"/> 20 MHz	20.000000	<input type="radio"/>	16.500001 25.000000 17/15m
<input type="checkbox"/> 6m BPF/LNA	50.000000	<input type="radio"/>	25.000001 35.600000 12/10m
<input type="checkbox"/> ByPass/55 MHz HPF		<input type="radio"/>	35.600001 61.440000 6m/ByPass

Auto ☐ Manual ☒

The above picture shows the Alex HPF/LPF filter selections when the VFO is set to 6 meters with the ByPass “6m BPF/LNA” check box unchecked. The 6 meter Low Noise Amplifier is active.

The screenshot shows the 'Antenna HPF/LPF' window. The '6m BPF/LNA' checkbox is checked. The 'Active' column has radio buttons. The 'LPF' column has frequency ranges and their corresponding HPF values. The '6m/ByPass' LPF is selected, showing a frequency range of 35.600001 to 61.440000 MHz. The 'Manual' radio button is selected.

ByPass	HPF	Active	LPF
<input type="checkbox"/> 1.5 MHz	1.800000	<input type="radio"/>	0.000000 2.500000 160m
<input type="checkbox"/> 6.5 MHz	6.500000	<input type="radio"/>	2.500001 5.000000 80m
<input type="checkbox"/> 9.5 MHz	9.500000	<input type="radio"/>	5.000001 8.000000 60/40m
<input type="checkbox"/> 13 MHz	13.000000	<input type="radio"/>	8.000001 16.500000 30/20m
<input type="checkbox"/> 20 MHz	20.000000	<input type="radio"/>	16.500001 25.000000 17/15m
<input checked="" type="checkbox"/> 6m BPF/LNA	50.000000	<input type="radio"/>	25.000001 35.600000 12/10m
<input type="checkbox"/> ByPass/55 MHz HPF		<input type="radio"/>	35.600001 61.440000 6m/ByPass

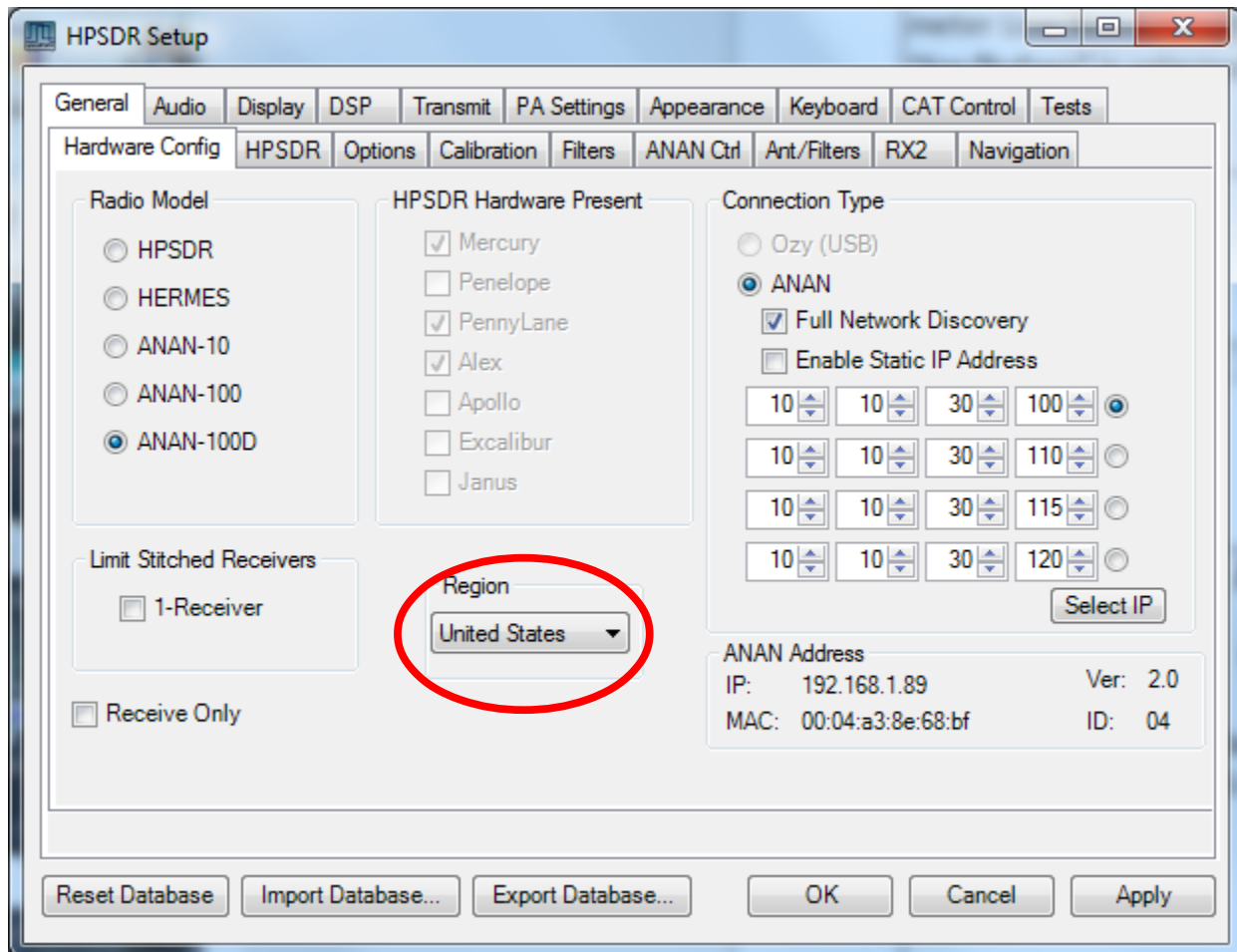
Auto ☐ Manual ☒

The above picture shows the effect when the ByPass “6m BPF/LNA” check box is checked. The 6 meter Low Noise Amplifier (pre-amp) is off, no HPF filter is active, and the 35.6 - 61.44 LPF “6m/ByPass” is selected.

US Military Auxiliary Radio System (MARS) operation.

The United States Military Auxiliary Radio System (MARS) authorizes its Licensed US Amateur members to operate on selected US Military frequencies. These frequencies are very often located near existing US amateur bands.

PowerSDR provides the capability to restrict transmitter operation to the bands authorized in specific regions. See the "Region" list box selector below:



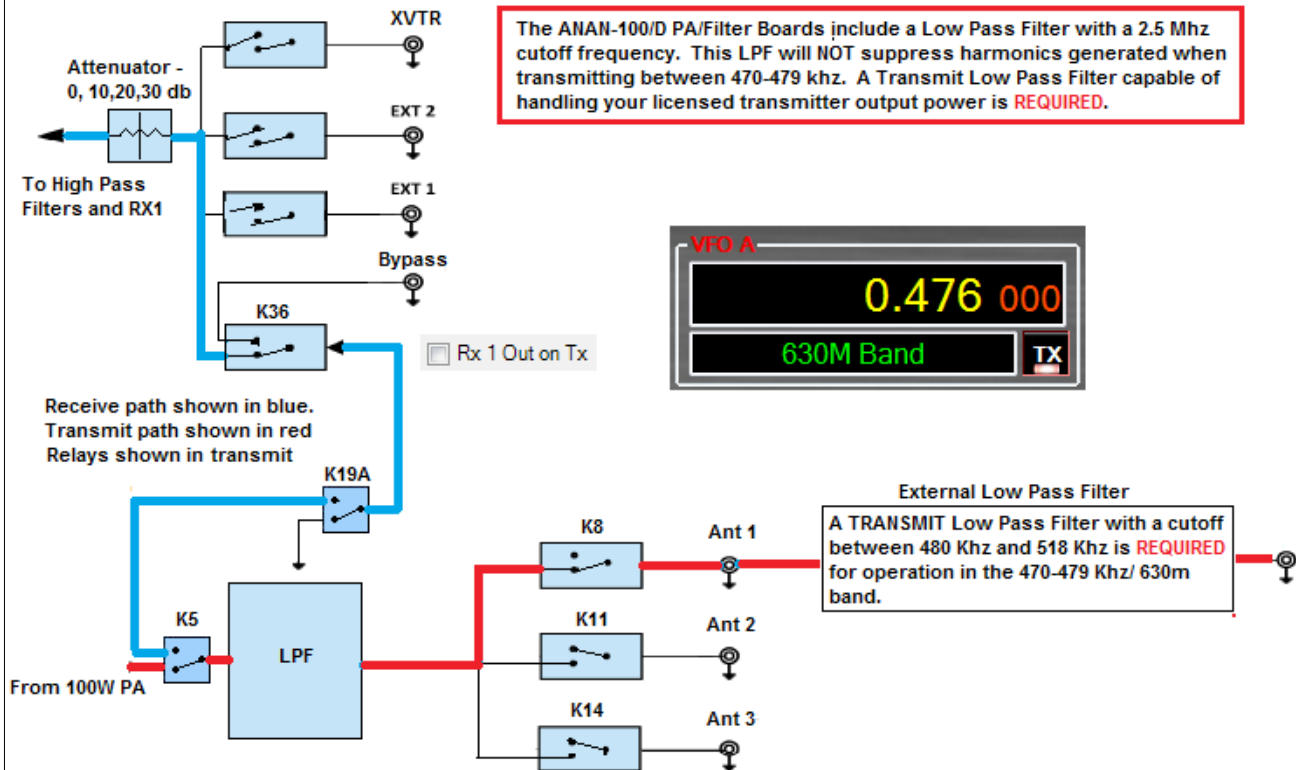
The selected "Region" can be changed from "United States" for example to "Extended" to permit transmit operation on frequencies outside the Amateur bands. Users should be cautioned this capability can result in violations thru the use of frequencies not authorized for Amateur use in your country.

PowerSDR will automatically select the proper HPF and LPF filters for all frequencies between 1.8 mhz and approximately 61 mhz when the "extended" region is selected. Use with caution.

Licensed 470-479 Khz / 630 meter operation

The ANAN-100 and ANAN-100D PA/Filter boards include a fixed hardware LPF with a cutoff frequency of about 2.5mhz. This LPF filter cannot reduce the radiation of harmonics occurring below 2.5 Mhz. Operation in the 470-479 khz / 630 m band **REQUIRES** an external low pass filter capable of suppressing any harmonics which may be generated when transmitting on those bands. This LPF must be capable of handling full licensed transmit power. License may be required in your country.

Apache Labs ANAN-100 or ANAN-100D Licensed operation on 470-470khz



Antenna HPF/LPF

ByPass	HPF	Active	LPF
<input type="checkbox"/> 1.5 MHz	1.800000	6.499999	0.000000
<input type="checkbox"/> 6.5 MHz	6.500000	9.499999	2.500001
<input type="checkbox"/> 9.5 MHz	9.500000	12.999999	5.000001
<input type="checkbox"/> 13 MHz	13.000000	19.999999	8.000001
<input type="checkbox"/> 20 MHz	20.000000	49.999999	16.500001
<input type="checkbox"/> 6m BPF/LNA	50.000000	61.440000	25.000001
<input type="checkbox"/> ByPass/55 MHz HPF			35.600001
			61.440000

160m
80m
60/40m
30/20m
17/15m
12/10m
6m/ByPass

☐ Auto ☒ Manual

When the VFO is tuned below 1.8 Mhz, PowerSDR automatically bypasses all HPF.

The 160m LPF has no practical effect when transmitting in the 470-479khz band therefore harmonics are not suppressed.