

HAMBUILDER

RADIOWORK

USER MANUAL

HBR4HFX V2.0



100W SSB/CW HF Transceiver

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WELCOME TO HAMBUILDER RADIOWORK

HBR4HFX V2.0 , is another 4-banders with small size desktop transceiver and big power. A large display using a 3.2" Color TFT LCD will indulge your eyes when you do QSO. Adjustable power out from QRP level up to 100W will take you to explore the world of HF to the fullest. This radio now has built in mic compressor, no need to speak loud in front of the microphone. TCXO (temperature compensate Xtal Oscillator) used as source frequency for the digital synthesizer to provide minimal frequency drift cause of temperature. HBR4HFX V2.0 is here to answer your needs, large display, great power out with very low cost price, simple to operate and easy to maintain.

DISCLAIMER :

- This is a homebrew, assembled by hands radio, not a product of a factory mass manufacturing.
- Please refrain from comparing our products with the likes of Icom's , Yaesu's, etc.
- Our products are low-cost, simple, and minimalist.
- We conduct our business professionally with honesty and pride.
- Hambuilder strives to provide economically priced products to support radio hobbyists and hams all around the world.

Specification :

*. Frequency Coverage (programmable) :

- 80m (3.500.000 - 3.999.990)
- 40m (6.900.000 - 7.499.990)
- 30m (10.100.000 - 11.449.990)
- 20m (14.000.000 - 14.349.990)

- *. Tuning step : 1Hz, 10Hz, 100Hz, 1KHz, 10KHz, 100KHz (rotary dial push to change step)
- *. Display : 3.2 Inch 320x480 pixel TFT
- *. Dimension : 90mm (height) x 220mm (wide) x 130mm (deep)
- *. Controller : ATmega128
- *. Main mixer : ADE-1 mixer
- *. IF Frequency : 8.000000 MHz
- *. Synthesizer : Si5351 with TCXO source clock
- *. Selectivity : 4 pole crystal ladder filter (3KHz nominal bandwidth)
- *. Power out : at 13.8V 100W at 80m, 90W at 40m, 60W at 30m, 30W at 20m
- *. Adjustable RX gain setting with MMIC MSA series front end amplifier up to 0.1uV sensitivity
- *. Adjustable TX gain setting (adjustable power out 0-100W)
- *. Adjustable AF gain setting
- *. Adjustable Mic gain setting with built in low noise mic compressor based on IC MAX9814
- *. Adjustable IF Shift Offset, RIT, XIT
- *. 2 x IRFP150 final transistor
- *. CW shaping filter with SSB
- *. Iambic keyer with programmable WPM or straight key (set 0 WPM) option setting
- *. PSU Voltage 13.8 V (12-13.8 V)
- *. RX current consumption : 380 - 500 mA (Vcc 13.8 V)
- *. TX current consumption : 80m 18 A, 40m 18 A, 30m 13A, 20m 10 A (Vcc 13.8 V)

- *. 2 Watt, Speaker out
- *. 10 functional button

NOTE :

Does not support CW QSK

Package you will get:

- HBR4HFX unit with fully assembled and ready to use (1)
- DC chord (1)
- Condenser Microphone (1)

PSU requirement

- Voltage 12-13.8V
- Current 18A

FRONT PANEL DESCRIPTION

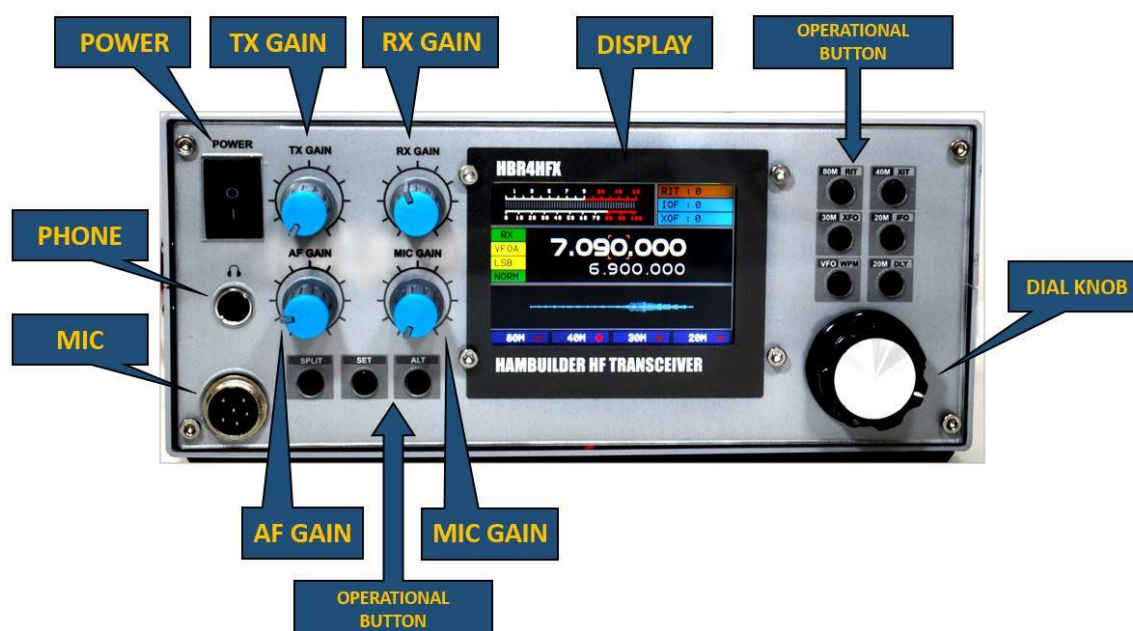


Fig.1.Front Panel

1. Power
Used to turn ON/OFF the Radio
2. Dial Knob
Used to dial frequency operation. You can push the dial knob to set dial step (default 1KHz), step option is 1Hz, 10Hz, 100Hz, 1KHz, 10KHz and 100KHz then back to 1Hz. This dial knob also used to set any value.

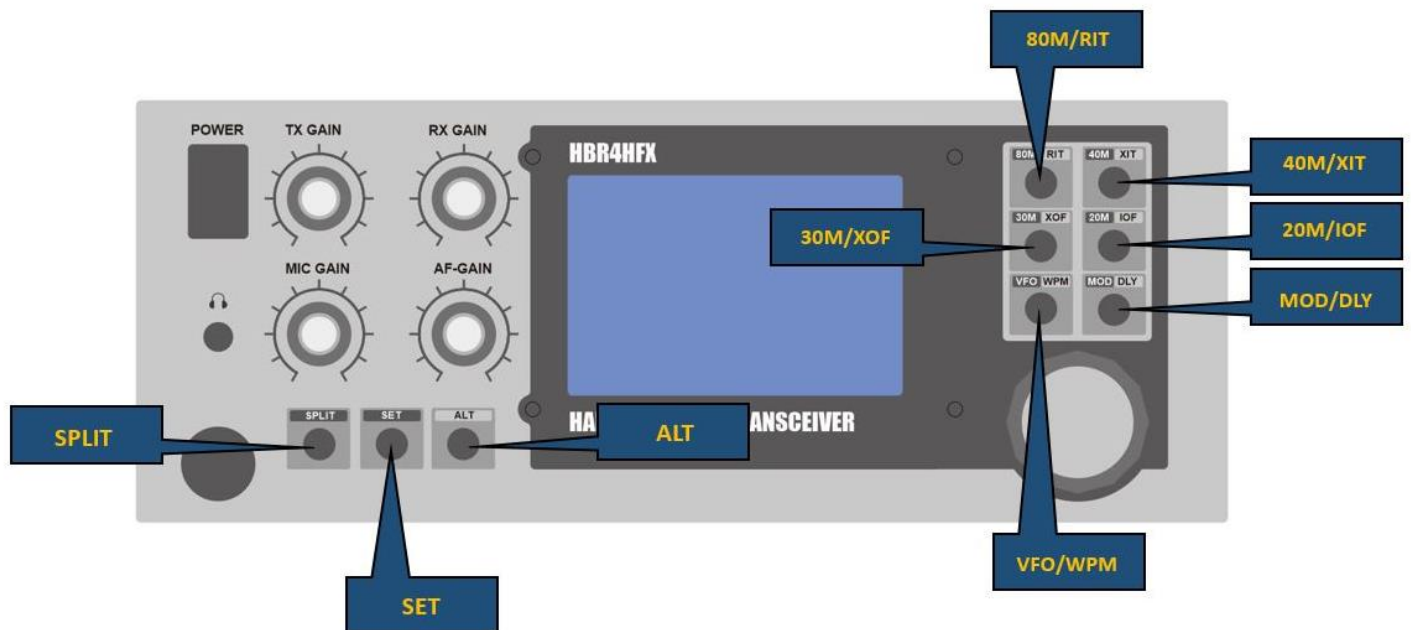


Fig.2. Operational Button

3. Operational Button :

- **80M**, used to dial **80m band**
- **40M**, used to dial **40m band**
- **30M**, used to dial **30m band**
- **20M**, used to dial **20m band**
- **VFO**, used to select **VFO A/B**
- **MODE**, used to select transmission mode **USB – LSB - CW**
- **SPLIT/NORMAL** : **SPLIT** which means is **RX = VFO A, TX = VFO B**
NORMAL which means is **RX/TX in the same frequency**

ALT Button : To activate this button, you must press the ALT button

- **RIT** : Receiver Incremental Tuning
- **XIT** : Transmitter Incremental Tuning
- **IOF** : Intermediate Frequency Offset
- **XOF** : Xtall Offset
- **WPM** : Speed Iambic (**1-40 values for iambic**) and (**0 values for straight**)
- **DLY** : CW delay for EOT TX (End Of Transmission)
- **SET** : Setting
- **ALT** : Alternate

4. Liquid-Crystal Display (LCD)

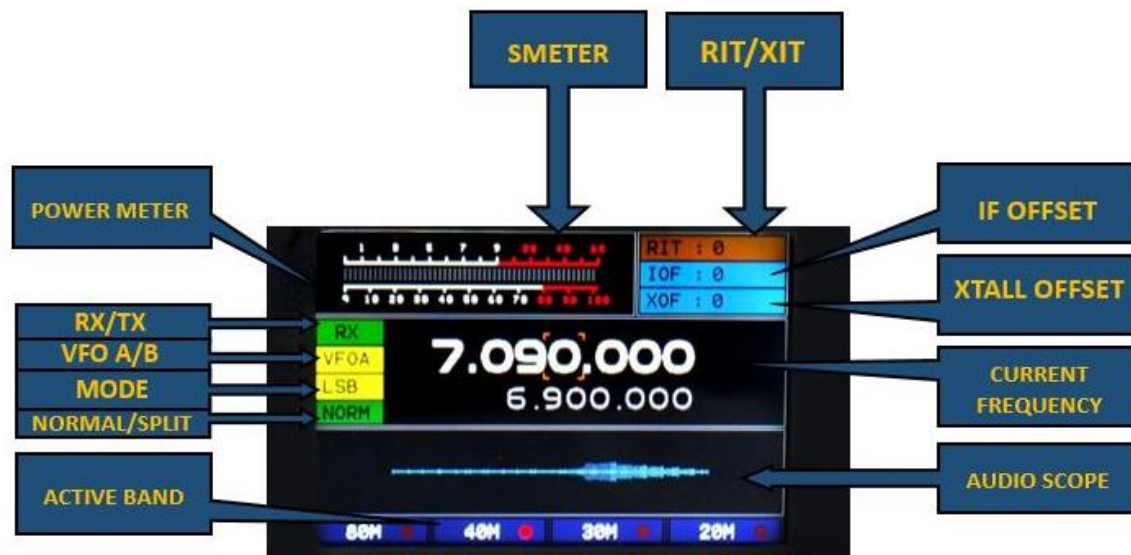


Fig. 3. Display

5. TX Gain

Adjust the potentiometer will set the RF power out level. This level set is not linear scale but logarithmic scale. The output level also depend on operational band (see specification)

6. RX Gain

Adjust the potentiometer to set front end signal level (sensitivity)

7. Mic Gain

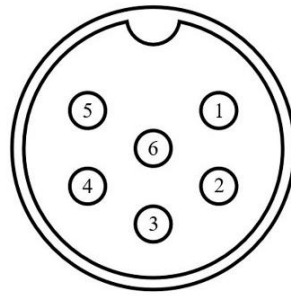
Adjust the potentiometer will set the microphone gain level

7. AF Gain

Adjust the potentiometer will set speaker volume level

8. Mic Connector

Connect the micro-phone to this connector. This Radio used condenser microphone. See image bellow for the mic connection pin



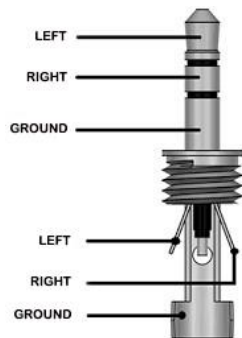
- 1. MIC**
- 2. GROUND**
- 3. PTT**
- 4. - (Prepared for the next project)**
- 5. - (Prepared for the next project)**
- 6. - (Prepared for the next project)**

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Fig. 4. Mic connection pin out

9. Phone

The phone jack need 3.5mm audio jack stereo (L+R joined) or mono phone. Please take a note this output is totem pole, and isolated from ground. If you want to connect it to external amp, please make sure no ground loop connect.



REAR PANEL DESCRIPTION

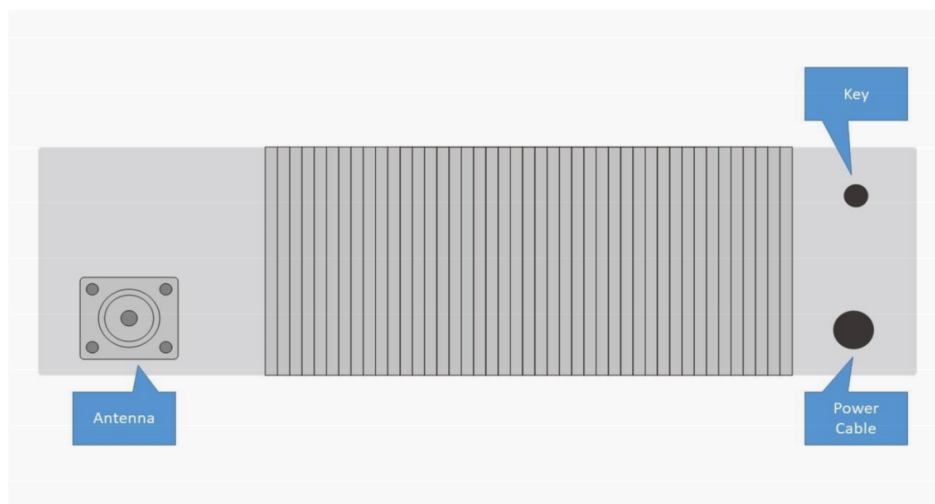


Fig. 5. Rear Panel

1. Antenna

This PL259 with impedance connect the Radio to 50 ohm Antenna. Beware of high SWR antenna.

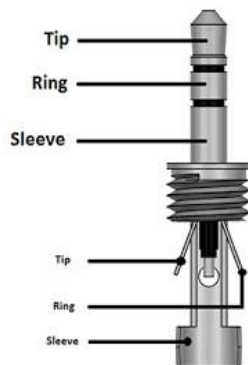
2. Key Socket

Key for CW used 3.5mm stereo audio jack, with connection dit–dah–gnd for tip-ring-sleeve. For CW operation just connect the dit or dah to ground in CW mode (see button) then the radio will automatically generate iambic mode keyer. If you want to use straight CW mode set the WPM no 0 . Note : When you do the CW mode please be sure that MIC Gain on minimum value.

Tip = dah

Ring = dit

Sleeve = ground



3. Power cable

Power cable for the Radio.

Additional setting

Beware, adjust or do additional setting may cause the radio stop working properly, please make sure you understand about this additional setting.

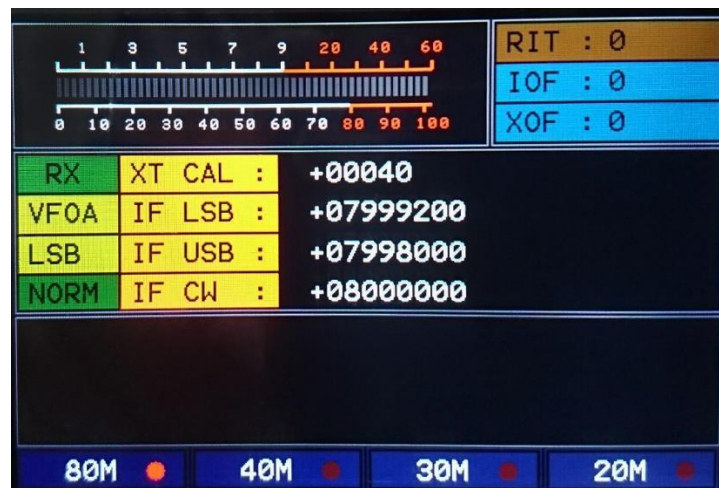


Fig. 6. Calibration setting

Calibration setting : To activate this button, you must press the **SET button + ALT button**

1. XT CAL

Default correction value is zero except already calibrate. This nominal value show Si5351 XTAL calibration to produce accurate frequency out. Read the vfo value on VFO out pin by using the frequency counter. If frequency counter read value did not show exact 10MHz please dial knob left or right until the frequency counter show 10.000.000 Hz.

To choose : **XT CAL** press the **SET button + ALT button** To change the value, Press Rotary for the Step. When you done with the value press 80m button again to save. And **ALT Button for exit**



2. LSB and USB IF

IF LSB and USB value used to set up IF offset value for ladder crystal filter **IF LSB Press 40m button**,

IF USB press 30m button. Changing this value may also do for adjusting audio pitch some people like or easy to hear more SSB bass audio but other more treble. You can adjust this value meanwhile listen RX state. To change the value, Press Rotary for the Step. When you done with the value press the button again. According to the initial button you pressed. (IF LSB Press 40m - IF USB press 30m) And **ALT Button for exit**

IF LSB



IF USB



3. IF CW

IF CW Press 20m button ,with same method above



Additional Band Range setting

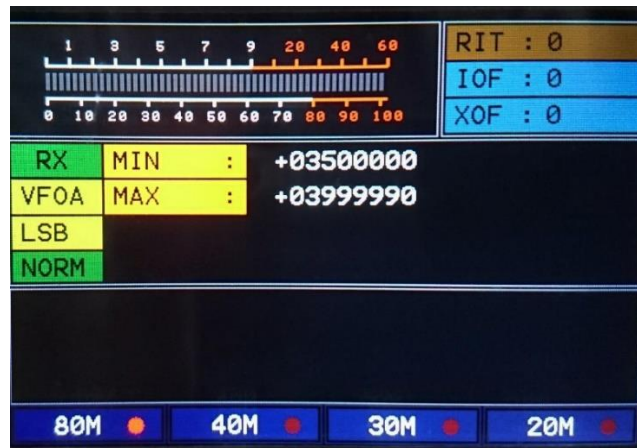
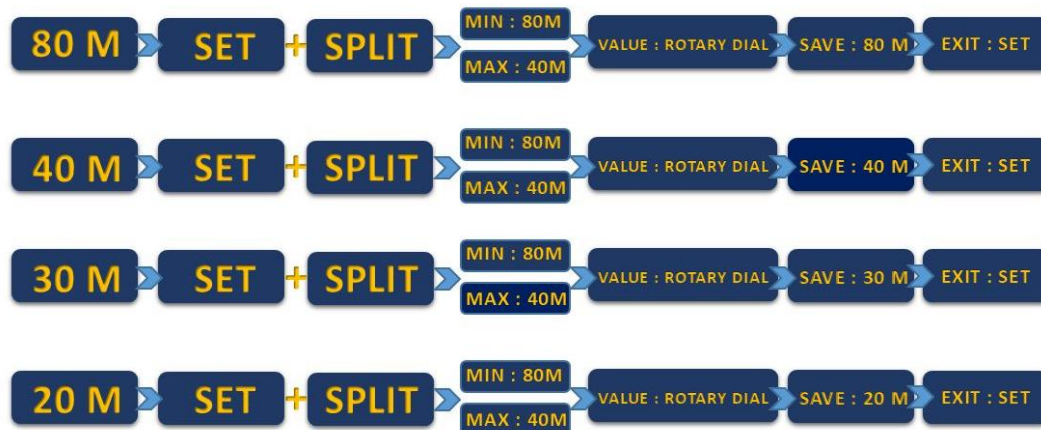


Fig. 7. Band Range setting

Band Range setting : To activate this button, you must press the **SET button** and **SPLIT button**



4. Band Min

Band range start. Beware of the filter range.

For the band Min to choose : **SET button** and **SPLIT button** + **MIN Press 80m Button**

To change the value, Press Rotary for the Step. When you done with the value press the button again (80m Button) And **SET Button** for exit.

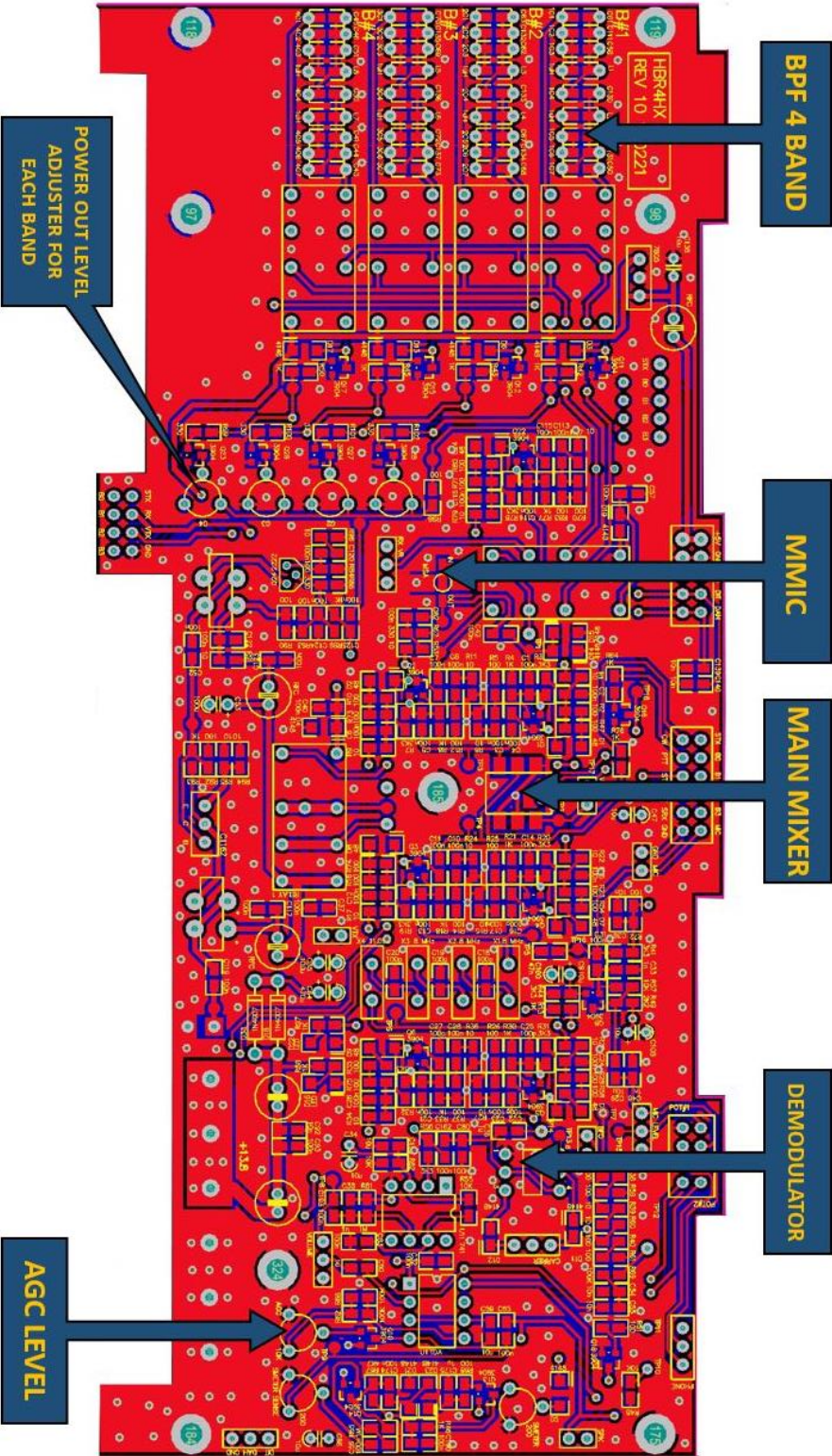
5. Band Max

Band range stop. Beware of the filter range.

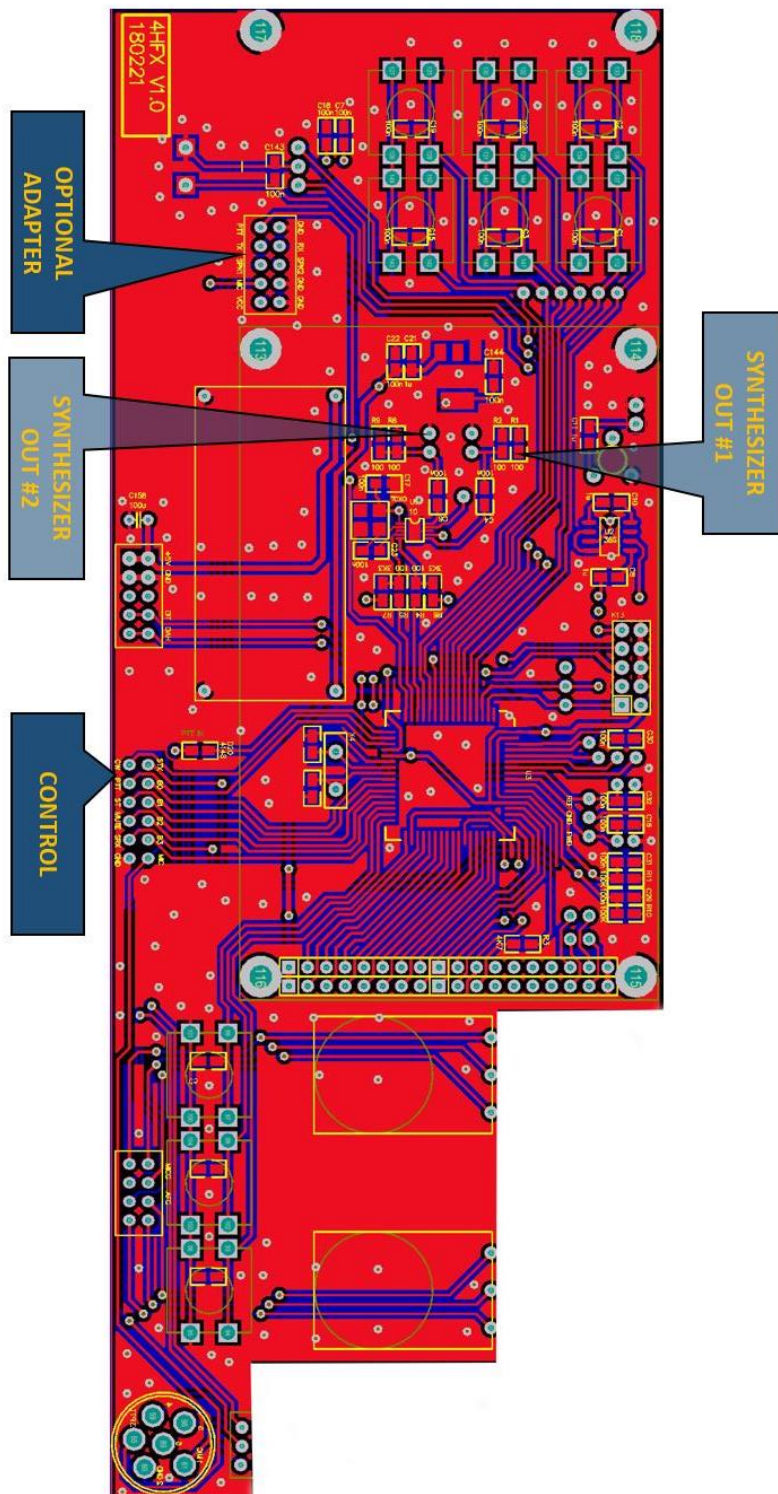
For the band Max to choose : **SET button** and **SPLIT button** + **Max Press 40m Button**

To change the value, Press Rotary for the Step. When you done with the value press the button again (40m Button) And **SET Button** for exit

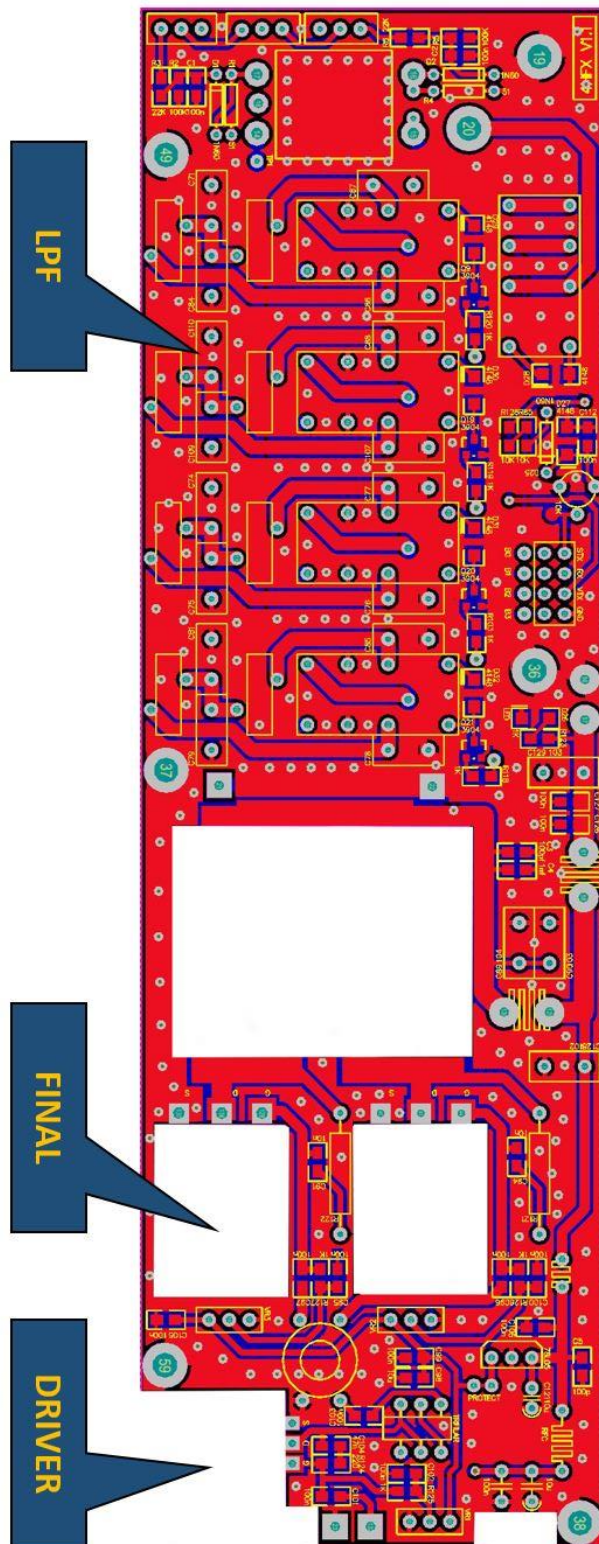
BOARD LAYOUT



MAIN BOARD



CONTROLLER BOARD



PA BOARD

Dear Customer,

If you have experience difficulties and problems in operating the radio unit, please contact us through email or WhatsApp. and please take a note we will answer within 1x24 hours, due to the time difference between Indonesia and abroad

Here are our contacts:

Email: support@hambuilder.com

Email: jalapindai@gmail.com

WhatsApp: +6281312349961

YouTube Channel: Hambuilder Radiowork

www.hambuilder.com

Kindly Regards,

Hambuilder Team