

# HB-1A three-band CW QRP transceiver Manual



## Introduction:

HB-1A with a small size, light weight, can be built-in batteries, particularly suitable for travel, picnics and other outdoor activities.

HB-1A covered 20 meters, 30 meters, 40 meters amateur bands. With the DDS circuit to generate VFO signal, it can also work outside of the three amateur bands. It can cover between 5-16MHz band short wave radio bands. Each CW and SSB IF filters have four bandwidths to choose, you can receive a good SSB, AM and CW signals. Also cross-contact can be used.

HB-1A built-in 8 AA batteries, can provide about 2-3W of RF power, with external 12V power about 4W output power. HB-1A using low-power design, the receive current is approximately 55mA.

HB-1A at the same time the LCD display: frequency, operating mode, supply voltage, S meter, receive fine-tuning (RIT) and other information, It is very convenient to use.

HB-1A have 20 frequency storage memory can be convenient to change the operating frequency and band. Frequency step Can be easily to change, amateur bands: 100Hz, 1KHz, 100KHz. Radio frequency bands: 100Hz, 5KHz, 100KHz. Receive fine-tuning (RIT) has the step two respectively 10Hz and 100Hz.

## Specifications

<b>Size:</b>	140*95*35mm (not including protrusion of the knob, etc.)
<b>Weight:</b>	about 500g (not including batteries)
<b>Supply voltage:</b>	9-14VDC
<b>Current drain</b>	
<b>Receive:</b>	about 55mA (No signal)
<b>Transmit:</b>	about 550-950mA (according to the different supply voltage)
<b>Frequency range</b>	
<b>Receive:</b>	5-16MHz continuous

**Transmit:** 7.0-7.3MHz, 10.1-10.15 MHz,14.0-14.35 MHz  
**VFO:** DDS circuit with 50MHz reference frequency  
**Display:** 1602 LCD.  
**Output power:** 12V supply 4W、13.8V supply 5W  
**Side tone:** about 700Hz  
**Automatic key:** adjustable speed Built-in.  
**Selectivity:** 4 crystal filter, SSB bandwidth of about 2.2-1.6KHz four selectable bandwidth, CW bandwidth of about 900-400Hz four selectable bandwidth.  
**Audio Output:** 8 ohm load about 0.1W(Need to take stereo plug)

## Connection

### Built-in battery

Removed the two screws on the back can be installed or replacement battery(8 AA size).

### External power supply

Any 9-14V DC voltage or battery can be connect to (12VDC). It has a polarity protection circuit

### Antenna

Any resonant antenna can be connect directly to the antenna (ANT) with a BNC connector, for non-resonant antenna need to insert an antenna tuner

### Headphones

Stereo headset will be connected to the headphone port (PHONE), impedance 8-32 ohm.

### Key/Paddle

The **HB-1A** has an automatic function that determines what type of key is being used and is initiated at Power On time. you will be heard (in CW) the sound of the letter "A" if the paddle is connected or the letter "M" if the straight key is connected.



Connect to paddle dot  
or straight key's contactor

Connect to paddle dash  
or straight key's ground

Connect to paddle's ground  
or straight key's ground

3.5mm stereo plug

## The operation of HB-1A

When power on, you will be heard (in CW) the sound of the letter "A" if the paddle is connected or the letter "M" if the straight key is connected. (If not connected any key, will hear the letter "A").

### V/M/SAV Button



Click this button will be Alternating between Memory mode(MEM) and VFO mode, the LCD screen will show the EME-\*\* or VFO-\*\*( \*\* The figures for 01-20). In Memory Mode the **Tuning** knob is used to change memory locations. In VFO Mode the **Tuning** knob is used to change the frequency.

Press the **V/M/SAV** button for 2 seconds(the LCD screen will display SAVE), the current frequency and current mode will be stored in the Memory Location selected.

### RIT/MOD button



Click this button to enter or exit RIT function. A dash (-) will be displayed to the right of the frequency display as shown above.



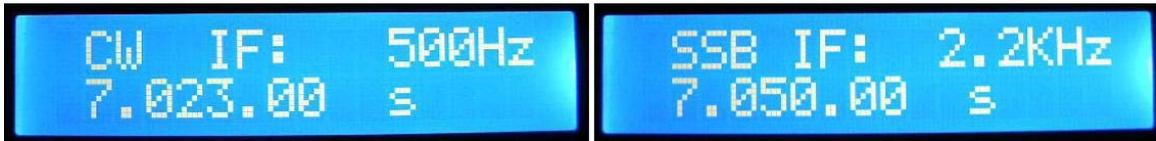
When in the **RIT** mode, turning the tuning knob clockwise raises the frequency (as indicated by the up arrow). turning the tuning knob counter-clockwise will lower the frequency (as indicated by the down arrow).

To Change mode, press and hold the **RIT/MOD** for 2 seconds. This will allow you to change the mode from **CW** to **USB** to **LSB** and **CW** again. Press and hold the **RIT/MOD** for 2 seconds for each change.

### ATT/IF button



Click this button can ON or OFF the **ATT**(receiver attenuation). The **S** in the LCD display will change to **A** indicating the ATT is ON.



Pressing the **ATT/IF** for 2 seconds will cause the receiver to enter the IF band width change mode.

While in the IF bandwidth change mode, Click this button to change the bandwidth. when Completed, Pressing the **ATT/IF** for 2 seconds again to exit.( If do not make any operation, a several seconds after it will be automatic exit)

### Change the Frequency Tuning Steps

While in receiving mode, pressing the tuning knob lightly will change the tuning step to either 100Hz or 1KHz(in the RIT mode, will be 10Hz and 100Hz). As the change is made, the position in the display that the step is being changed to will momentarily display an underscore ( \_ ) for verification of the change.

If you Pressing the tuning knob for 2 seconds, the tuning step will be 100KHz.(This operation could not be used in the RIT mode)

### Frequency locking function



Simultaneously press both **V/M/SAV** and the **RIT/MOD** for about 1 second. To lock or unlock the tuning knob, In lock mode the symbol (#) will be displayed next to the frequency. In this mode, Rotation the tuning knob can not change the frequency.

## Automatic key function

### Automatic call CQ

Press the CQ/SET button lightly to send "CQ CQ CQ DE (your call sign three times) PSE K". If the CQ is to be cancelled press CQ/SET button for 1 second at any time during the CQ.

### Change speed

Press CQ/SET button for approximately 2 seconds and the Morse code letter "S" will be heard, then release the button. Within 5 seconds, push the paddle to the DOT side to increase the keyer speed or to the DASH side to decrease the keyer speed. When complete, press CQ/SET lightly to exit (the letter "E" will be heard).

### How to enter your call sign

Press CQ/SET button and hold about two seconds, you can hear the Morse code letter "S", continue to hold down the CQ/SET button until you hear the letter "I", at this time release CQ/SET button, and then send your call sign with paddle as usual. When done, a short click CQ/SET button to exit, you can hear Morse code letter "E", or wait for about several seconds, it will automatically exit.

### Turn off the automatic call CQ function

If you do not want automatic call CQ function, by the following operation you can cancel this feature.

Press CQ/SET button and hold about two seconds, you can hear the Morse code letter "S", continue to hold down the CQ/SET button you hear the letter "I", then continue to hold down the CQ/SET button until you hear the letter "C", at this time release CQ/SET button, push the paddle to the DASH side to choose automatic call CQ function "OFF" (can be heard Morse Code OFF). If you want to restore this function, after re-entering, push the paddle to the DOT side to choose automatic call CQ function "ON" (can be heard Morse Code ON)

## Transmitting



When transmitting on the frequency of: 7.0-7.3MHz, 10.1-10.15MHz or 14.0-14.35MHz, the HB-1A will display the approximate power output.

The letter "S" is replaced with the letter "P" followed with a series of vertical bars. Each 3 bars represents approximately 1 watt of output power.



When trying to transmit on the Frequency outside the amateur frequencies, HB-1A will not transmitting, the display will show **TX ERROR** flashing.

### The DDS frequency calibration

**Note:** This operation will reset the 20 frequency memory to its original value. And, you need a frequency meter to calibrate the frequency of DDS. If no need, please do not do this.

Turn-off power, Simultaneously press both **V/M/SAV** and the **RIT/MOD**, turn-on power, holding down the two keys until you see the LCD display like this, then release the keys.



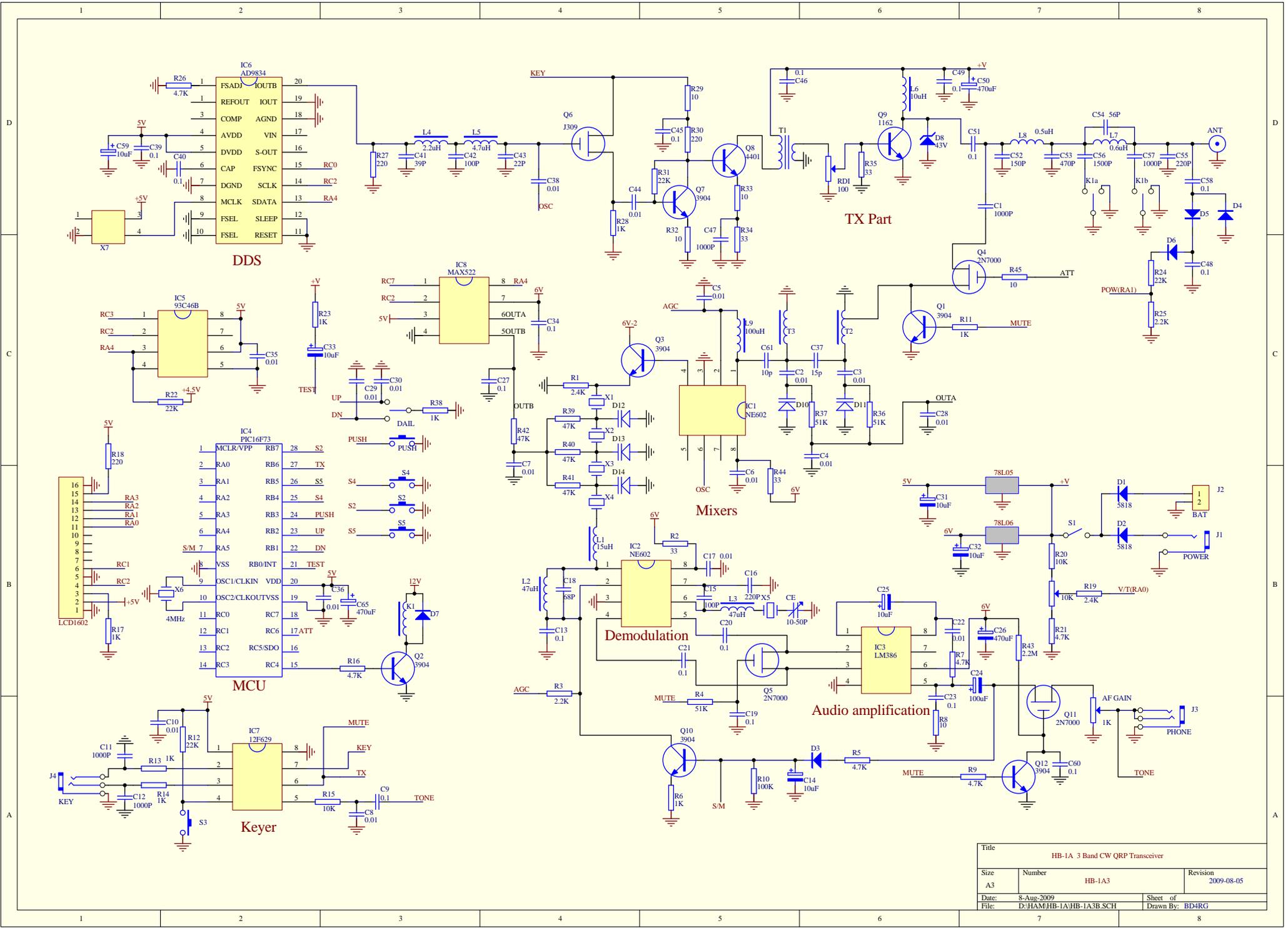
A few seconds after entering the DDS calibration state, the LCD display will show below:



Testing the frequency at IC1's pin6 with a frequency meter, Adjust the frequency with tuning-knob, Until the frequency of reading is the same as the LCD display. Press the **RIT/MOD** button to exit.

### Circuit Details

Please refer to the attached circuit diagram.



Title			
HB-1A 3 Band CW QRP Transceiver			
Size	Number	Revision	
A3	HB-1A3	2009-08-05	
Date:	8-Aug-2009	Sheet of	
File:	D:\HAM\HB-1A\HB-1A3B.SCH	Drawn By:	BD4RG