

# TEN-TEC R4020/R4030 two-band CW QRP transceiver Manual



## Introduction:

The R4020/R4030 is small in size, light weight, has provisions for optional built-in batteries, and is especially suitable for travel, picnics and other outdoor activities. This is a Trail Friendly Radio (TFR).

**R4020 covers 40 meter and 20 meter amateur bands.**

**R4030 covers 40 meter and 30 meter amateur bands.**

Because the unit uses DDS electronics to generate it's VFO signal, it can also receive outside of the two amateur bands between 5-16MHz.

The R4020/R4030 features IF filters for CW and SSB reception.

The R4020/R4030 has two optional battery holders that hold a total of 8 AA batteries, or it can be powered with an external 12V power supply. The receive current is approximately 55ma. Output power using Alkaline batteries is approximately 4 watts. Output power using an external 13.8V power supply is approximately 5 watts.

The R4020/R4030 uses an LCD display to show: frequency, operating mode, supply voltage, S meter, receive-incremental-tuning (RIT) and other information.

The R4020/R4030 has a 20 frequency storage memories making it convenient to change the operating frequency and bands. Frequency steps can be easily changed. Amateur bands: 100Hz, 1KHz, 100KHz. Short Wave general coverage frequency bands: 100Hz, 5KHz, 100KHz. Receive-incremental-tuning has two steps respectively 10Hz and 100Hz.

## Specifications

**Cabinet Size:** 140\*95\*35mm (5.7"X3.7"X1.4") (not including knobs.)

**Weight:** about 500g (15.8 oz) (not including batteries)

**Supply voltage:** 9-14VDC

**Current drain**

**Receive:** about 55mA (No signal)

**Transmit:** about 550-950mA (according to the supply voltage)

**Frequency range**

**Receive:** 5-16MHz continuous

**Transmit:** R4020 7.0-7.3 MHz, 14.0-14.35 MHz  
R4030 7.0-7.3 MHz, 10.1-10.15 MHz  
**VFO:** DDS circuit with 50MHz reference frequency  
**Display:** 1602 LCD.  
**Output power:** 12 V supply 4W, 13.8V supply 5W,  
**Side tone:** about 700Hz  
**Automatic key:** Built in with adjustable speed.  
**Selectivity:** 4 crystal filter, SSB bandwidth of about  
2.2-1.6KHz four selectable bandwidth,  
CW bandwidth of about 900-400Hz in four  
selectable bandwidth.  
**Audio Output:** 8 ohm load about 0.1W(Requires a stereo plug)

## Connection

### Built-in battery

Remove the two screws on the back to install the battery holder or to replace the batteries (8 AA size).

### External power supply

Any 9-14V DC voltage or battery pack can be connected to the transceiver. It has a built in polarity protection circuit.

### Antenna

Any resonant antenna can be connected directly to the antenna (ANT) with a BNC connector. If a non-resonant antenna is used an antenna tuner will be necessary.

### Headphones

A Stereo headset can only be connected to the headphone port (PHONE), impedance 8-32 ohm. Do not use a Mono plug.

### Key/Paddle

The **R4020/R4030** has an automatic function that determines what type of key is being used and is initiated on Power up. You will hear (in CW) the sound of the letter "A" if a paddle is connected or the letter "M" if a straight key is connected.



Connect tip to paddle dot  
or straight key's contactor.

Connect ring to paddle dash  
or straight key's ground.

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

Tie Ring and Sleeve together for straight key.

3.5mm stereo plug

## The operation of R4020/R4030

When power is turned on, you will hear (in CW) the letter "A" if a paddle is connected or the letter "M" if a straight key is connected. (If no key is connected you will hear the letter "A").

### V/M/SAV Button



Click this button to alternate between Memory mode (MEM) and VFO mode, the LCD screen will show the MEM-\*\* 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.



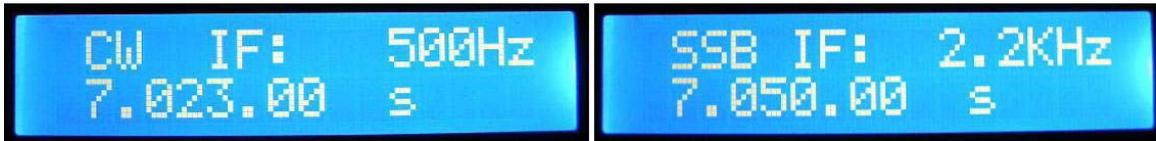
When in the **RIT** mode, turning the tuning knob clockwise raises the frequency (as indicated by the up arrow). Turning the tuning knob counter-clockwise will lower the frequency (as indicated by the down arrow).

To Change modes, 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 to turn 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 ATT/IF to change the bandwidth. When completed, Press the **ATT/IF** for 2 seconds to exit. (If no button is pressed within several seconds it will be an 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 RIT mode, 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 press the tuning knob for 2 seconds, the tuning step will be 100KHz.(This operation can not be used in the RIT mode)

### Frequency locking function



To **lock or unlock the tuning knob** simultaneously press both **V/M/SAV** and the **RIT/MOD** for about 1 second. In lock mode the symbol (#) will be displayed next to the frequency. In this mode, Rotation the tuning knob will 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 finished, 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 the paddle as usual. When done, a short click of the CQ/SET button to exit, you will hear Morse code letter "**E**", or wait for several seconds and it will automatically exit.

### Turn off the automatic call CQ function

If you do not want the automatic call CQ function. The following operation will cancel this feature.

Press CQ/SET button and hold about two seconds ,you will hear the Morse code letter "**S**", continue to hold down the CQ/SET button until 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**" (Morse Code "ON" can be heard)

### Transmitting



When transmitting the **R4020/R4030** 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 any Frequency outside the amateur frequencies, R4020/R4030 will not allow transmitting, the display will show **TX ERROR** flashing.

### **Tune Function with paddles.**

Turn power switch to off position, While holding down the "dash" paddle turn the power switch to the on position. The letter "M" in Morse code will be heard.

Pressing the "Dot" paddle causes the radio to have a continuous emission. This can be used to tune an external tuner or to check SWR.

When you are finished tuning, turn power switch off and on again to activate the paddles for normal operation.

### **Battery Installation**

#### **Make sure the power switch is in the off position.**

Using the supplied "AA" Battery packs and connector with cable.

Wire the packs in series.

The packs should be wired so that the black wire from one pack connects to the outside pin of J2 (Pin 1) that is closest to the board edge.

The red wire from the other pack connects to the J2 (Pin 2) the pin furthest from the board edge.

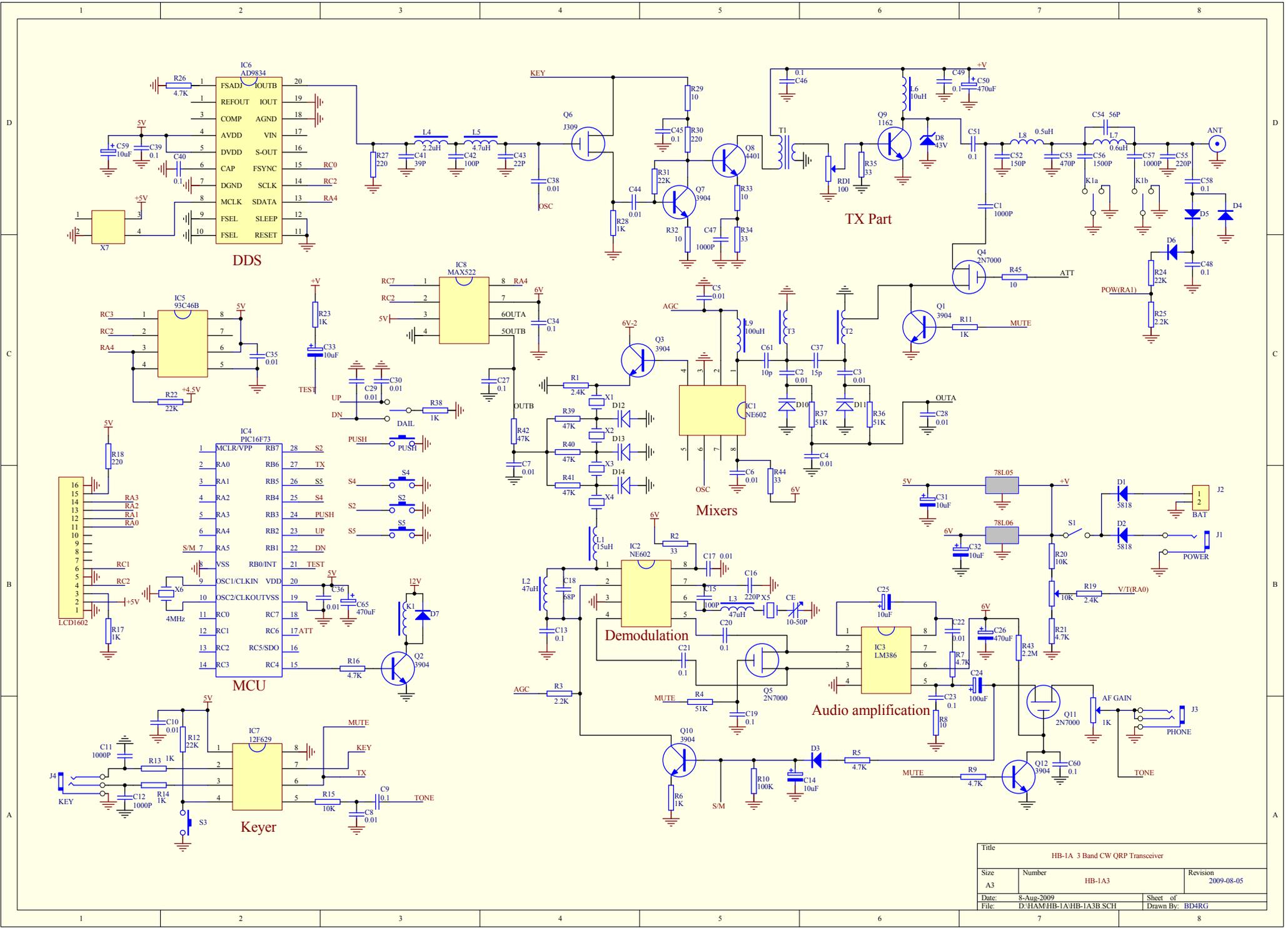
Now connect the remaining red and black wires from the two packs together.

Care should be taken to mount the flat side of the battery packs to the transceiver bottom panel with double sided tape.

Insulate your connections with heat shrink tubing, install batteries and verify that 12 volts is present to connector J2.

#### **Make sure the power switch is in the off position.**

Plug the connector into J2 and turn the power switch to ON and verify the power supply voltage on the display.



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