Baofeng UV-5R

From The RadioReference Wiki

Most of the information on this page is also relevant to the UV-82, BF-F8HP, and similar models that share the same microprocessor and RF chipset. It is not known how much of this information is relevant to other firmware versions, models or clones from other manufacturers.

Contents

Baofeng UV-5R Notes (BFS311 Firmware)

Test Unit

- Baofeng UV-5R (purchased new in 2013)

- Firmware BFS311 130903N
- S/N US201311****
- S/N may also be a date code. Unit was purchased in 11/2013 and may have been manufactured the same month.

Battery Saver

When Menu 3 SAVE is enabled, the receiver is periodically turned off to reduce power consumption.

- SAVE=OFF: Power saving disabled.
- SAVE=1: RX on ~0.2 S, RX off ~0.13 S.
- SAVE=2: RX on ~0.2 S, RX off ~0.23 S.
- SAVE=3: RX on ~0.2 S, RX off ~0.33 S.
- SAVE=4: RX on ~0.2 S, RX off ~0.43 S.

In dual watch mode (Menu 7 TDR ON) the receiver on time is doubled to approximately 0.4 second due to checking two channels instead of one.

Battery Saver is activated after ~9 seconds of no receive and no keypad activity.
Battery Saver is disabled while scanning.

Birdies

The UV-5R has a 26 MHz reference oscillator. Reference oscillator harmonics can be heard on 156.0, 416.0, 442.0, 468.0 and 494.0 MHz.

CTCSS

- CTCTSS transmit and receive tone frequencies can be set via the numeric keypad to any frequency from 60.0 to 259.9 Hz in 0.1 Hz increments. The up/down arrow keys srcoll through the standard tone frequencies.

DTMF

- On firmware version BFS311, and possibly others, it is not possible to send a DTMF "D" tone. Pressing the [EXIT] key sends "0" instead of "D".
- If Menu 16 DTMFST is set to ANI-ST, the internal microphone is hot when DTMF or 1750 Hz burst tones are transmitted. Pressing keypad keys while transmitting does not mute the mic. The mic can pick up the sidetone from the speaker and overdrive or distort the transmitted tones.
- Setting Menu 16 DTMFST to DT-ST or DT+ANI mutes the microphone preventing it from interfering with transmitted DTMF and 1750 Hz burst tones.
- Setting Menu 16 DTMFST to OFF disables the sidetone but doesn not mute the mic. Mic audio can possibly interfere with transmitted tones.

Entering Frequencies

- When entering frequencies via the keypad in VFO (Frequency) Mode the radio will only accept 6 digits; three before the decimal point and three after the decimal point.
- The kHz part of the frequency (the digits to the right of the decimal point) must be divisible by the step size (Menu 1 STEP).
- The radio will only accept 0 or 5 in the third decimal place.
- You cannot enter a frequency with more than 3 decimal places, such as 451.0025 or 451.00625, using only the number keys.
- If the third decimal place is not 0 or 5 the radio will round down to the nearest step. You must enter the next higher digit or use the up/down arrow keys to change the rest of the digits. You must have Menu 1 STEP set to the correct step size.
    - To enter 451.0025 the step must be set to 2.5K and you must press [4] [5] [1] [0] [0] [3] or [4] [5] [1] [0] [0] [2] [UP ARROW].
    - To enter 451.00625 the step must be set to 6.25K and you must press [4] [5] [1] [0] [0] [7] or [4] [5] [1] [0] [0] [6] [UP ARROW].
    - To enter 451.0125 the step can be set to either 2.5K, 6.25K or 12.5K and you must press [4] [5] [1] [0] [1] [3] or [4] [5] [1] [0] [1] [2] [UP ARROW].
    - To enter 451.1 the step can be set to either 2.5K, 6.25K, 12.5K, 20.0K, 25.0K, or 50.0K and you must press [4] [5] [1] [1] [0] [0].

Factory Test Frequencies

- Several people have reported newly purchased units with the following frequencies preprogrammed from the factory.
- The exact frequencies and number of channels may vary with different models and firmware versions. (See CCR Default Frequencies (/index.php/CCR_Default_Frequencies))

UV-5R BFS311 130903N Factory Frequencies

```
Ch  Freq     Tone
 1  452.1250  69.3
 2  453.2250  91.5
 3  454.3250  136.5
 4  455.4250  151.4 / 177.3 (UV-5R III)
 5  456.5250  192.8 / 210.7 (UV-5R III)
 6  457.6250  241.8
 7  458.7250  025N
 8  459.8250  134N
 9  461.9250  274N
10  462.2250  346N
11  463.3250  503N
12  464.4250  073R
13  465.5250  703R
14  402.2250
15  437.4250
16  479.9750
17  138.5500
18  157.6500
19  172.7500
20  438.5000 / 201.1250 (UV-5R III)
21  155.7000 / 235.2250 (UV-5R III)
22  Blank / 258.9250 (UV-5R III)
VFO A  155.500
VFO B  136.000 / 438.5000 (UV-5R III)
FM  100.7
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FM ABR SAVE Bug

When Menu 3 SAVE (power saver) is enabled, MENU 6 ABR (backlight timeout) is set to 9 or 10, and FM broadcast reception is active, several seconds after receiving a VHF or UHF signal the radio will make open squelch noise bursts over the FM broadcast audio and not properly revert back to the FM broadcast band receiver.

FM TDR Bug

Dual Receive (TDR) does not work while the FM broadcast receiver is active. Only the active display, the display with the arrow indicator or the display selected by Menu 34 TDR-AB, will receive signals while receiving FM broadcasts.

Power On Messages

Holding certain keys while powering on the unit displays the following messages:

- [3] Firmware version. If the firmware version is BFB229 through BFB296 this will show the actual firmware version. If the firmware version is BFB297 or later then you can only view the actual firmware version by using CHIRP programming software.
- [6] Unknown. May be firmware date code. Can be changed with CHIRP programming software.

Receiver

- Receiver makes crackling sounds while moving, even when receiving extremely strong signals

from a few feet away. This YouTube video (https://www.youtube.com/watch?v=jl40YU3Jsc4) demonstrates the problem. It may be an SDR artifact or caused by poorly written firmware controlling the AGC functions in the AT1846S transceiver chip. It does not appear to affect all radios. Some users experience this problem and others do not.
- Occasionally squelch opens and weak buzzing noises can be heard. May be SDR artifacts or microprocessor noise.
- Touching the antenna may overload or desense the receiver or cause it to go into oscillation. This appears to vary depending on the antenna used and the distance to strong local FM or TV broadcast signals.

Repeater STE and RL

- Menu 36 RP-STE delays the receiver from coming back on (keeps it muted) for up to ~1 second after PTT release; in other words it increases transmit to receive turnaround time.
- Menu 37 RPT-RL disables CTCSS or DCS decoding for up to ~1 second after PTT release and after the Menu 36 RP-STE delay time (if Menu 36 is not OFF). If no receive CTCSS or DCS is set (Menus 10 and 11 both OFF) then Menu 37 has no function. Menu 37 Settings 1 and 2 appear to be the same as OFF and appear to have no effect. Settings 3 to 10 increase the decoder disable time from ~50 mS to ~1 S.

Roger Beep

- 1st tone 1123 Hz 136 mS
- 2nd tone 865 Hz 202 mS
- No delay before tones are sent. No space between tones.

Scanning

- Scanning, and dual receive (TDR), stops on any signal or noise even in CTCSS/DCS decode mode.
- Scan speed is ~3.37 channels per second. (It takes 29.6 seconds to scan 100 channels)
- Scan delay time in CO mode is ~6 seconds.
- Scan resume time in TO mode is ~6 seconds. If the carrier drops in less than 6 seconds then scanning resumes immediately with no delay.
- TDR (dual receive) does not function while in scanning mode.

Squelch

- Setting Menu 0 SQL to 0 opens the squelch, settings 1-9 do not vary the squelch level much because of the factory default settings.
- CHIRP daily build 01/11/2015 or later includes the ability to set a squelch level value of 0 to 64 for each squelch menu setting. CHIRP daily build 02/02/2015 or later increases the maximum squelch level value from 64 to 123. See Squelch Levels (http://www.miklor.com/COM/UV_Squelch.php).
- Setting squelch level values above 60 or so will result in not being able to hear anything but

extremely strong nearby signals. Squelch menu setting 0 opens the squelch at all times regardless of what level value it is set to.
- Custom squelch level settings may not work in some firmware versions.

Squelch Tail Elimination (STE)

- When Menu 35 STE is ON, the radio sends a tone of ~55 Hz for ~280 mS when the PTT key is released. This occurs even if no CTCSS encode tone is selected (Menu 13 T-CTCS is OFF). Setting Menu 35 STE to OFF disables this.
- When DCS encode is enabled, the radio sends the standard DCS turnoff code (134.4 Hz tone) for ~280 mS when PTT is released. Setting Menu 35 STE to OFF disables this.
- The microphone remains hot while the STE 55 Hz tone or DCS 134.4 Hz turnoff code are being sent.
- In CTCSS or DCS decode mode if a signal with the proper CTCSS tone or DCS code is received and the tone/code is dropped, the squelch remains open for ~2 S.
- Upon receiving a 55 Hz tone the the receive audio is muted, even when there is no receive CTCSS or DCS tone selected and regardless of Menu 35 STE, Menu 36 RP-STE, and Menu 37 RPT-RL settings. The receiver remains muted for ~750 mS after the carrier or 55 Hz tone drops.

N5R-20 and N5R-30 Firmware Bug

According to a post on 8/19/2014 on the baofeng_uv5r Yahoo Group:

- Radios affected: All UV5R series radios with new N5R-20 and N5R-30 firmware. This includes UV5RA, RB, RC, etc., as well as GT-3, BFF8, F8HP, etc.
- Radios Not affected: This does not affect the UV82 series.
- What occurs: If MENU 8 (Beep) is set to OFF, the receiver is muted. Setting MENU 8 back to on un-mutes the receiver. This does not affect any other function of the radio. Only the Keypad Beep.

This firmware version first appeared around July or August 2014.

UV-5R Stock Dual Band Helical Antenna

- Labeled 136-174, 400-520 MHz
- Base is grounded.
- Tap point 11 turns up from base. Has 3 pF capacitor at tap point.
- Top section 19 turns from tap point to end of coil has wider spacing.
- Youtube video of antenna dissassembly: http://www.youtube.com/watch?v=MtnDvWGTKpk (http://www.youtube.com/watch?v=MtnDvWGTKpk)

Baofeng Menu / CHIRP Cross Reference

- CHIRP settings and Baofeng radio menu settings often use different terminology for the same radio parameter. The tables below are a cross reference.

- Some radio functions can only be set by programming software, so some CHIRP tabs or settings do not have a corresponding radio menu.

CHIRP Basic Settings Tab

CHIRP Basic	Baofeng Menu
Carrier Squelch Level	0 SQL
Battery Saver	3 SAVE
Backlight Timeout	6 ABR
Beep	8 BEEP
Timeout Timer	9 TOT
Display Mode (A)	21 MDF-A
Display Mode (B)	22 MDF-B
Standby LED Color	29 WT-LED
RX LED Color	30 RX-LED
TX LED Color	31 TX-LED
Roger Beep (TX)	39 ROGER
Roger Beep (RX)	40 A/B-BP

CHIRP Advanced Settings Tab

CHIRP Advanced	Baofeng Menu
VOX Sensitivity	4 VOX
Dual Watch	7 TDR
Dual Watch TX Priority	34 TDR-AB
Alarm Mode	32 AL-MOD
Voice	14 VOICE
Scan Resume	18 SC-REV
Busy Channel Lockout	23 BCL
Automatic Key Lock	24 AUTOLK
Squelch Tail Eliminate (HT to HT)	35 STE
Squelch Tail Eliminate (repeater)	36 RP-STE
STE Repeater Delay	37 RPT-RL

CHIRP Work Mode Settings Tab

CHIRP Work Mode	Baofeng Menu
VFO A/B Shift	25 SFT-D
VFO A/B Offset	26 OFFSET
VFO A/B Power	2 TXP
VFO A/B Bandwidth	5 WN
VFO A/B PTT ID	17 S-CODE
VFO A/B Tuning Step	1 STEP

CHIRP DTMF Settings Tab

CHIRP DTMF	Baofeng Menu
PTT ID Code	17 S-CODE
ANI Code	15 ANI-ID
ANI ID	19 PTT-ID
DTMF Sidetone	16 DTMFST
PTT ID Delay	20 PTT-LT

CHIRP Memory Properties General Tab

CHIRP Memory Properties General	Baofeng Menu
Tone Mode	(part of menus 10, 11, 12, 13)
Tone (Transmit PL or CTCSS)	13 T-CTCS
ToneSql (Receive PL or CTCSS)	11 R-CTCS
Cross Mode	(part of menus 10, 11, 12, 13)
DTCS Code (Transmit DPL or DCS)	12 T-DCS
RX DTCS Code (Receive DPL or DCS)	10 R-DCS
DTCS Pol	(part of menus 10, 12)
Duplex	25 SFT-D
Offset	26 OFFSET
Mode	5 WN
Power	2 TXP

CHIRP Memory Properties Other Tab

CHIRP Memory Properties Other	Baofeng Menu
BCL	23 BCL
PTT ID	19 PTT-ID
PTT ID Code	17 S-CODE

Software

- RT Systems UV-5R Software (https://www.rtsystemsinc.com/baofeng-uv-5r-radio-programming-software-s/2225.htm)
- CHIRP (http://chirp.danplanet.com) programming software
  - CHIRP_tone_programming.pdf (http://wiki.radioreference.com/images/0/0a/CHIRP_tone_programming.pdf) Examples of CHIRP CTCSS and DCS programming including how to program split tones.
  - CHIRP User's Mailing List (http://intrepid.danplanet.com/mailman/listinfo/chirp_users)

Related Links

- Baofeng/Pofung (http://www.baofengradio.com) company web site
- UV-5R replacement antenna list (https://gearctrl.com/best-antenna-baofeng-uv-5r/)
- miklor.com (http://www.miklor.com) FAQ and support site
- UV-5R_tech_discussion_fixes.pdf (http://kc9hi.dyndns.org/uv5r/programming/UV-5R_tech_discussion_fixes.pdf)

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