Amateur Radio Using Digital Modes
Lab 1: Setting up the Radio.

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- What you will need: Laptop running up to date build of Windows, Linux or Mac OSX.
- CHIRP-next software installed for programing the radio. (Otherwise, can be programmed manually).
- Radio and USB Programming cable from the Amazon Idea List.

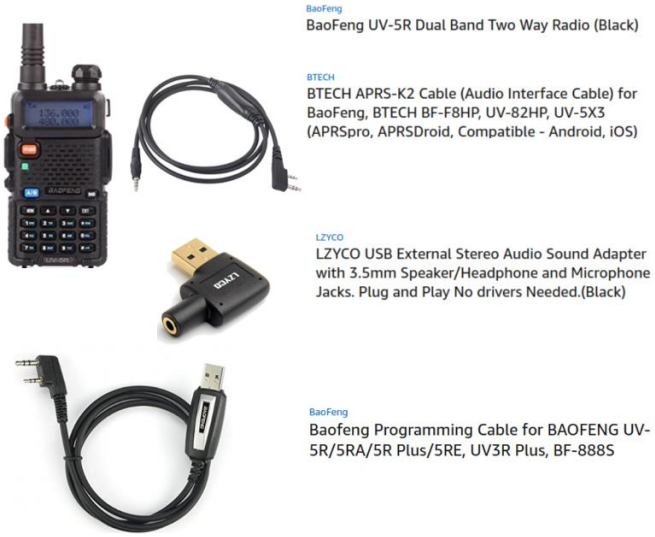


Illustration 1: Required Workshop Hardware

Purpose

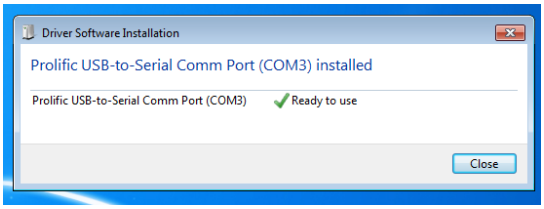
Setup and functional test of the Baofeng UV-5R radio.

Introduction

Before you begin, ensure the Baofeng UV-5R has been fully charged. Note the manual says it takes 4 hours with the standard charger to bring a Baofeng battery back to full charge. We will install cross-platform software called CHIRP-next for initial programming of the radio and then some manual tweaking. We will use the USB programming cable connected between your laptop and the radio.

Exercise

Software programming of Radio

STEPS		NOTES
1. Ensure the Baofeng UV5-R is fully charged, and the antenna is installed on radio.		
2. Download and install CHIRP-next software for your platform. Installation for major Linux distributions referenced from that page as well.		LINUX USERS. Since CHIRP-next needs access to USB-to-Serial device, ensure users who run CHIRP are added to the **dialout** group. sudo adduser $USER dialout Where $USER is a local user. You will need to logout and log back in for the group membership to be recognized. OSX USERS: CHIRP-next on OSX has dependencies that need to be installed first, as noted on the website.
3. Plug the USB Programming Cable into your laptop. The cable should register as a USB-Serial controller pl2303. Linux: port should register as /dev/ttyUSB0. Windows: Notification pop-up should include COM port.		 *Illustration 2: dmesg output from Linux*  *Illustration 3: Installed in Windows 7*
4. Plug the K2 connector end of the USB programming cable into the Baofeng UV5-R. Note orientation as depicted in illustration at right. Connection is tight so be sure connector is fully seated into the socket. DO NOT TURN ON THE RADIO YET.		 *Illustration 4: Note orientation of K2 connector*

5. Run CHIRP-next and select Download from Radio.

   We are making a backup image of your radio. Backup images are unique to each radio. You can only upload an image to your radio that has been originally sourced from a download of your radio.

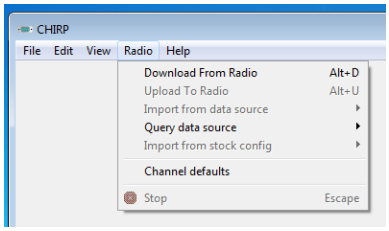


Illustration 5: CHIRP Menu

6. In the Radio window, set the following:
   - COM port used by the USB programming cable.
   - Make and model of Radio.
   - Click OK
   - Acknowledge Experimental Driver warning by clicking Yes

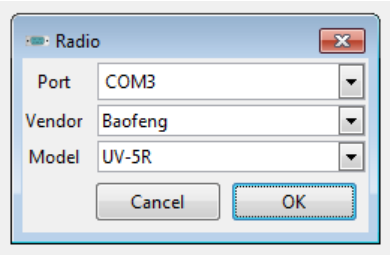


Illustration 6: Setting Radio and Connection in CHIRP-next

7. Follow the instructions in the pop-up window then click OK. The cloning process will begin creating an image in memory.

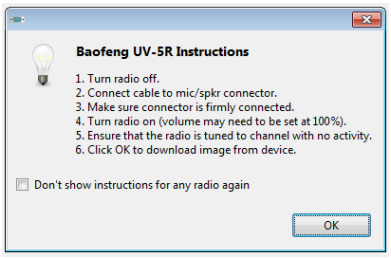


Illustration 7: Backing up your Radio.

8. Once complete a tabbed window will appear.
9. Select all the rows that have frequencies listed and delete rows.
10. Click File then Save As to create a backup image.

    For example: Baofeng_UV5-R_original.img

11. Familiarize yourself with the interface being sure to review the Settings tab.

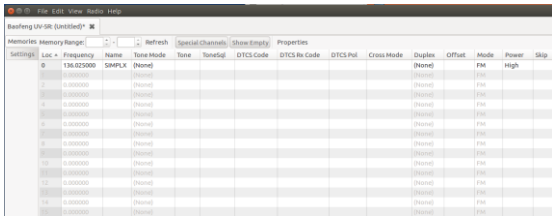


Illustration 8: Download from Radio result.

12. Next, we want to import the frequencies we will be using during the workshop. Download the HOPE workshop csv file.

    HOPE-workshop.csv

13. Within CHIRP select File, then Import, then open the file you just downloaded.

14. A window will pop-up showing the frequencies that will be imported. Click OK.

    NOTE: By default, frequencies imported will overwrite existing memory locations

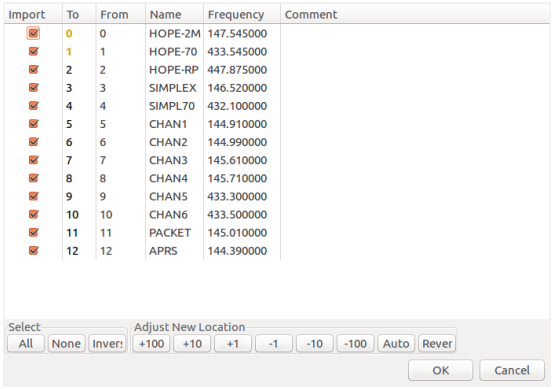


Illustration 9: Import HOPE Workshop Frequencies

15. Go to the Settings tab and make changes within the following sub menus:
    - Basic Settings
        - Display Mode (A) - NAME
        - Display Mode (B) - NAME
    - Advanced Settings
        - VOX Sensitivity - 3
    - Other Settings
        - VHF Lower Limit (MHz) - 144
        - VHF Upper Limit (MHz) - 148
        - UHF Lower Limit (MHz) - 420
        - UHF Upper Limit (MHz) - 450
    - Work mode Settings
        - Display - A
        - VFO/MR - Mode Channel
        - VFO A Power – Low
        - VFO B Power - Low

16. Save the new image using File and Save As to create a new image file.

    For example: HOPE_workshop.img

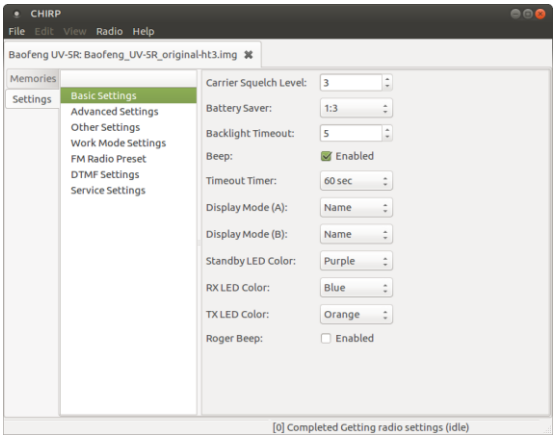


Illustration 10: CHIRP Settings Tab

17. With our new image created and saved, select Upload to Radio from the Radio menu. Validate the port setting then click OK.

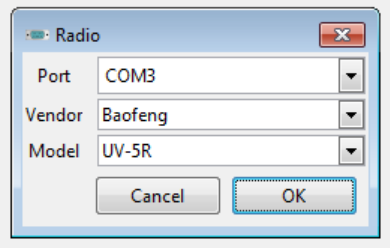
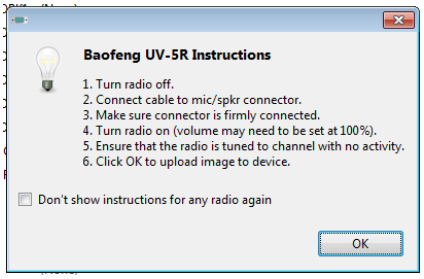


Illustration 11: Verify connection in CHIRP

18. Follow the instructions in the pop-up window that follows. Acknowledge Experimental Driver warning by clicking Yes. Your radio is now configured for the frequencies used in the workshop. Next let's test the radio.		 *Illustration 12: Instructions for Baofeng Radio*
19. With the frequency set for SIMPLX, make a transmission to another student whose radio is also on and set for SIMPLX. Note: Students will use their FCC issued callsign throughout the workshop. Those students unlicensed will operate under the special event issued callsign under the supervision of an FCC licensed control operator.		For example, here is a radio report exchange between to stations. "This is W2AAA. Can someone give me a radio check?" Someone may respond with the following: W2AAA this is W2BBB, I hear you loud and clear. Then you acknowledge the report "QSL. Your loud and clear as well. Thank you for the report. W2BBB this is W2AAA clear"

Manual Programming

While CHIRP-next takes care of the most tedious aspects of setting up and programming your radio, there are some configurations that are best verified manually.

This is especially important since we will be working with a number of radios transmitting in close quarters and want to reduce potential interference.

- Set Squelch (SQL) sensitivity to ignore noise.
- Set Transmit power (TXP) to low so we do not overload receive on radios using adjacent frequencies.
- Turn off all courtesy tone features.
- Set Voice Operation Transmission (VOX) sensitivity so the radio transmits when it hears audio from the USB sound device via the audio cable (we will install audio cable later.)

We can configure these settings manually by performing the following:

1. Press the MENU button then press the UP or DOWN buttons to cycle through the MENU items.
2. For each MENU item in the table at right, change the setting depicted.
    - Cycle to the MENU item using the UP and DOWN buttons.
    - Press MENU button again to enter configuration.
    - Pres UP or DOWN buttons to cycle through SETTING options.
    - Press MENU button again to confirm setting.
    - Press EXIT to leave programming.
3. With the additional settings made, go ahead and make another backup image of the radio.
    - Download from Radio.
    - File, Save As, HOPE_workshop.img

Menu	Function	Setting
0	SQL (Squelch Level)	3
2	TXP (Transmit Power)	LOW
4	VOX (Voice operated transmission)	3
34-37	Tail tone settings	OFF
39	ROGER (tone sent end of transmission)	OFF