



Radio Programming with CHIRP

Presented by
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What is CHIRP?

- CHIRP is a freeware open-source software utility designed for easy programming of amateur radios,
 - Developed by Dan Smith
 - Located on the web at <https://chirpmyradio.com/projects/chirp/wiki/Home>
 - Directly supports a few hundred different makes and models of radios
 - Usually provides access to radio features in addition to memory locations
 - Is available for Microsoft Windows, Linux, and Apple MacOS platforms
 - Is frequently updated to add additional support and/or features
 - Is available in a “Legacy” version and a “Next” version.
 - We will be discussing the Next version today...

Installing CHIRP

- The CHIRP installation will, of course, vary by platform. We will discuss the Microsoft Windows iteration today.
- Begin by downloading the current version...
 - https://archive.chirpmyradio.com/chirp_next/next-20250207/

	<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
	Parent Directory		-	
	chirp-next-20250207.app.zip	2025-02-07 02:20	43M	MacOS Application
	chirp-next-20250207-win64.zip	2025-02-07 02:20	23M	Windows standalone application
	chirp-next-20250207-installer.exe	2025-02-07 02:20	19M	Windows Installer (recommended)
	chirp-20250207.tar.gz	2025-02-07 02:20	2.2M	Source Tarball
	chirp-20250207-py3-none-any.whl	2025-02-07 02:20	1.9M	Python 3 wheel
	build_info/	2025-02-07 02:20	-	
	SHA1SUM	2025-02-07 02:20	828	

Installing CHIRP

- The frequent updates are called “*dailies*”...
- The “*dailies*” file names indicate the date of the release...
 - e.g., a daily named “*chirp-next-20250207-installer.exe*” was released on 7 February 2025.
- It is recommended that the CHIRP daily that you install be retained at least until the next update is successfully running
 - Occasionally, but very rarely, a new release will be problematic, and by uninstalling that update and reinstalling the previous version, you can keep on working.
- Some anti-virus utilities may flag CHIRP dailies as being infected
 - *It is safe to ignore these warnings, provided that you obtained the CHIRP file directly from the CHIRP website.*

Windows Defender

- If Windows Defender flags the CHIRP install program as an infector, the dialog at right will appear.
- Click the “More info” link to continue the installation.



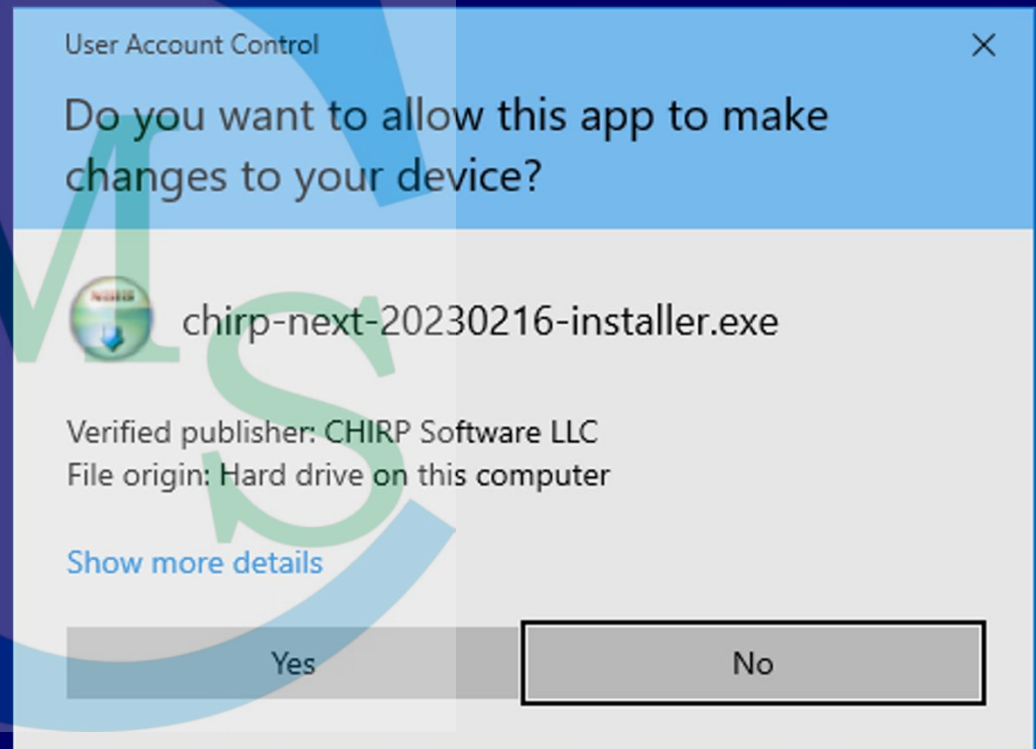
Windows Defender

- In the next dialog that appears, shown at right, you must click on the “Run Anyway” button in order to continue with the CHIRP installation routine.



Windows User Account Control Issue

- The Windows UAC system may prompt you, depending upon its settings, to approve the installation of the program.
- Click “Yes” to continue with the installation.

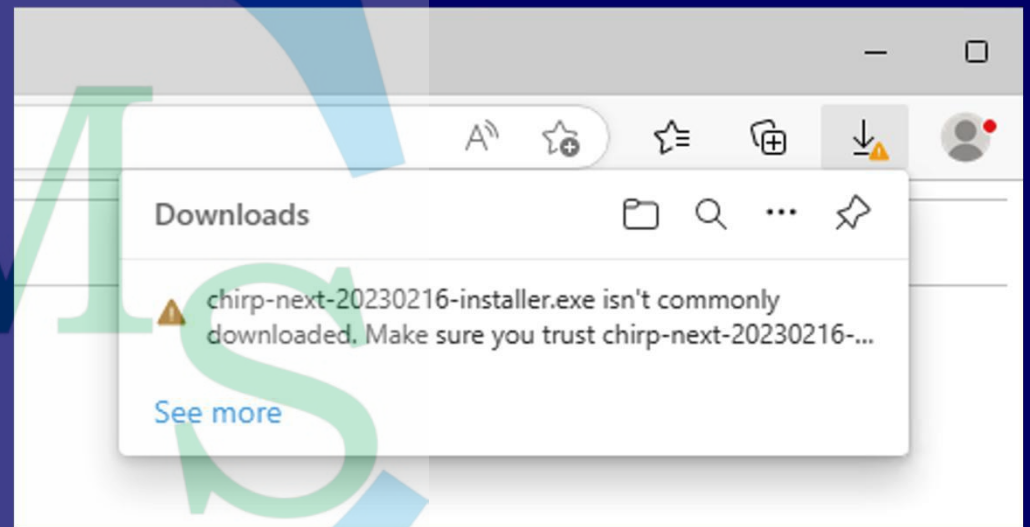


Microsoft Edge Browser Issues

- When downloading CHIRP via the Microsoft Edge web browser, a unique problem can crop up whenever you download a file that Edge flags as “not commonly downloaded”.
- This happens frequently with .exe files and other executable files.
- It is a behavior that is by design, and is intended to protect your system.
- The next four slides explain how to get around this issue...

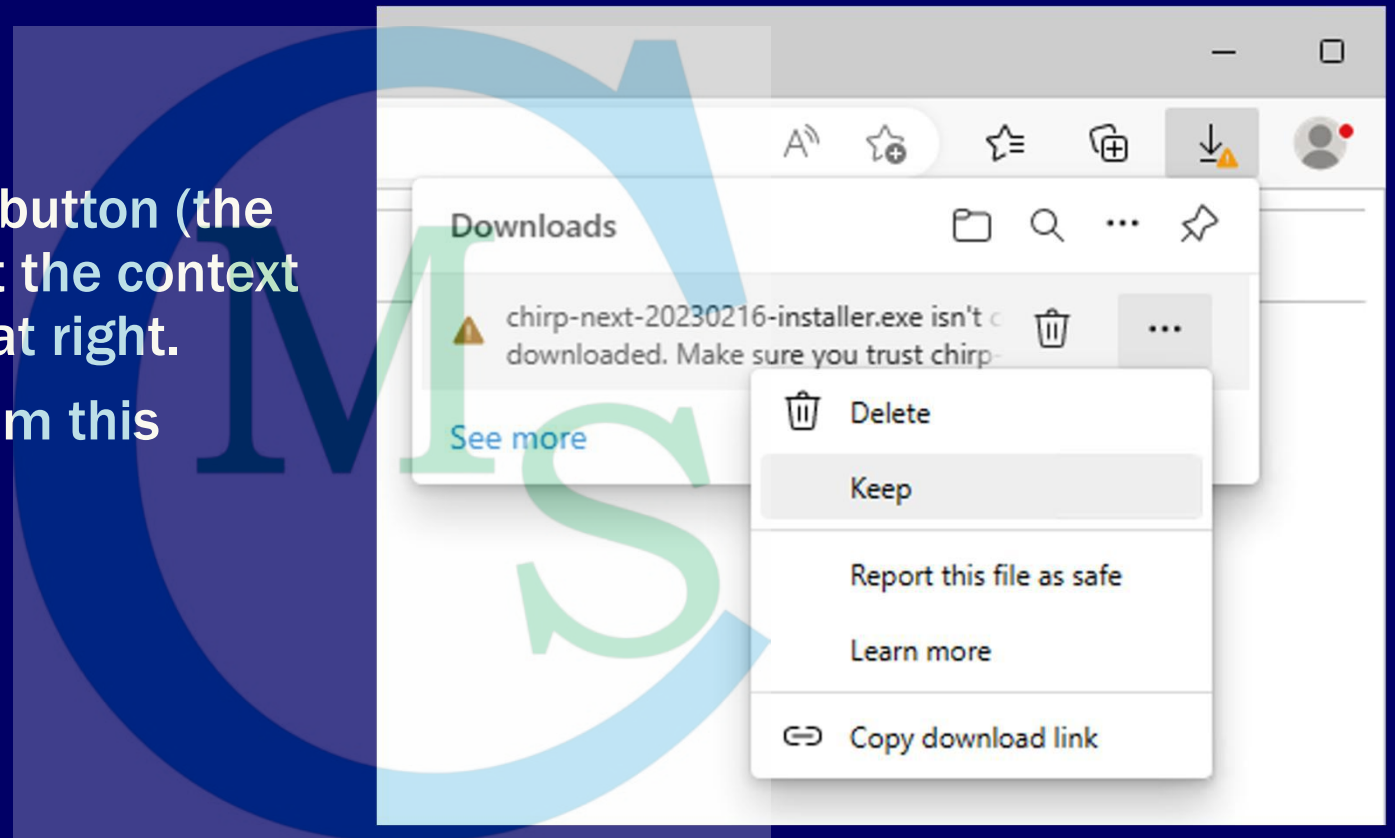
Step 1

- Edge flags the file, and may list it in the browser Downloads list as “unconfirmed”.
- The dialog at right will appear if you click on the file in the list. If not, right-click on the file entry in the Downloads list.



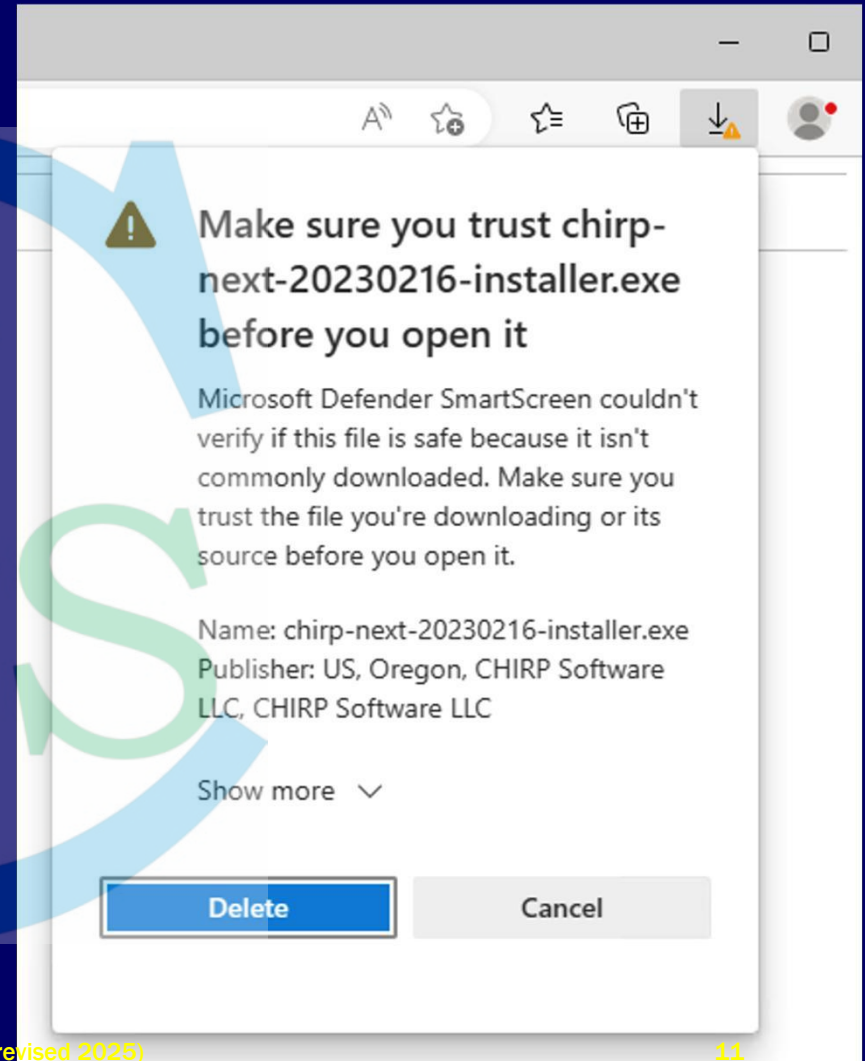
Step 2

- Click the ellipsis button (the three dots) to get the context menu as shown at right.
- Select “Keep” from this context menu.



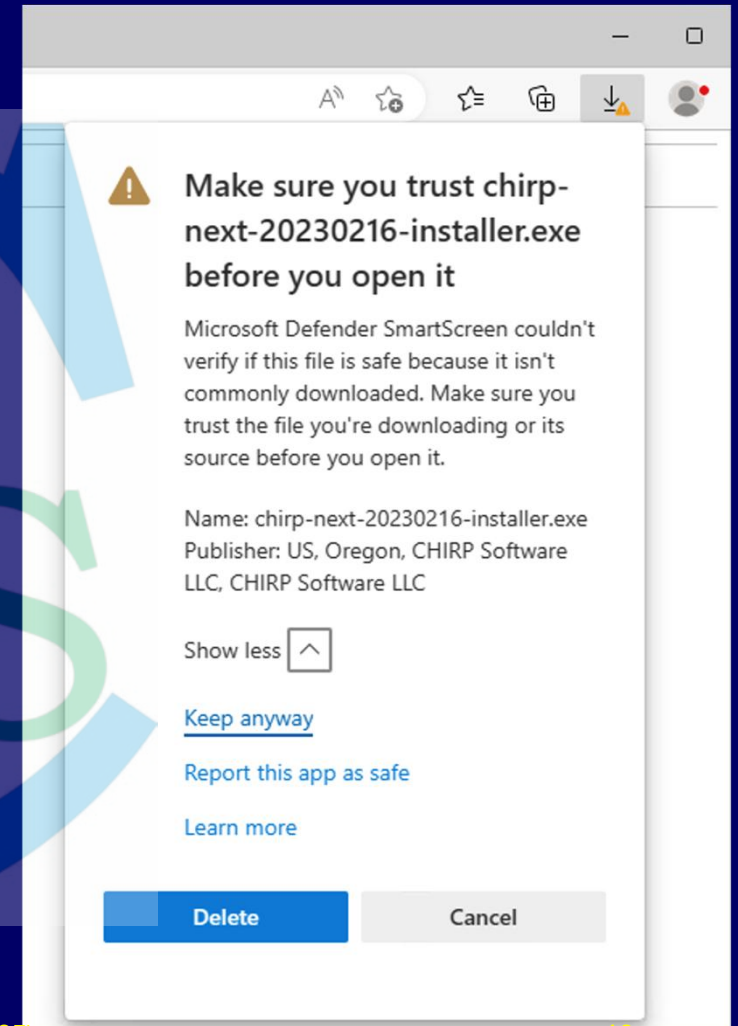
Step 3

- The dialog at right will then appear.
- Click the “Show More” text to continue with the download.



Step 4

- To finish up, click the “Keep Anyway” item from the list in the dialog that appears.
- The file will then be confirmed and will thus be ready for installation.



Installing CHIRP

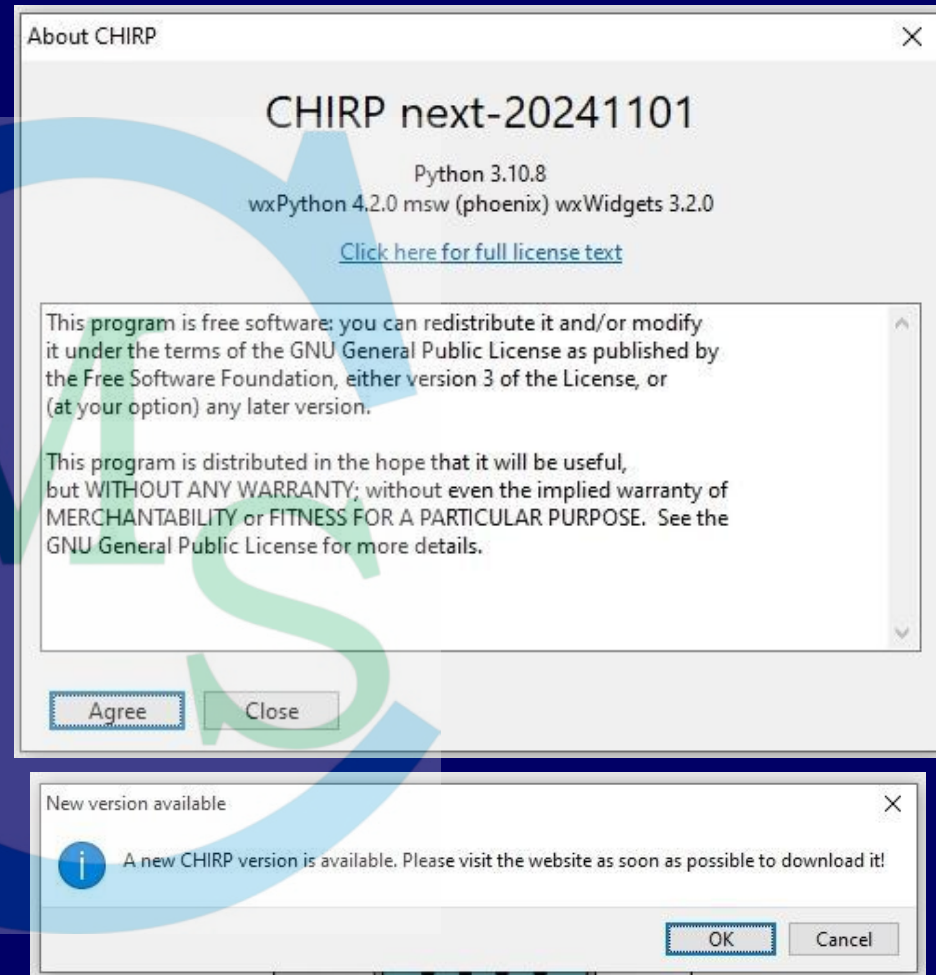
- Once the download has been successful, browse to the downloaded file location, which is usually the Downloads folder under the current user, and then double-click on the downloaded CHIRP daily.
- Follow the simple installation routine, confirming the options as they are presented.
- The install itself takes a matter of seconds to complete.
- If you are installing a CHIRP update, the previous install does not have to be uninstalled, but it does need to be in a not-running state.

Running CHIRP

- Double-click on the new CHIRP icon to launch the application.
 - The icon may be on the Desktop, and it will also be found in the Start Menu programs list.
- Make sure that your radio is connected to the PC and that the radio is in its ready-to-program mode.
 - Some models simply have to be turned on with the audio gain turned up to about 75% of maximum.
 - Others may need to be started in a certain manner, or may need to be placed into a *program* or *clone* mode.
 - Check and follow the manual directions for entering the program or clone mode.

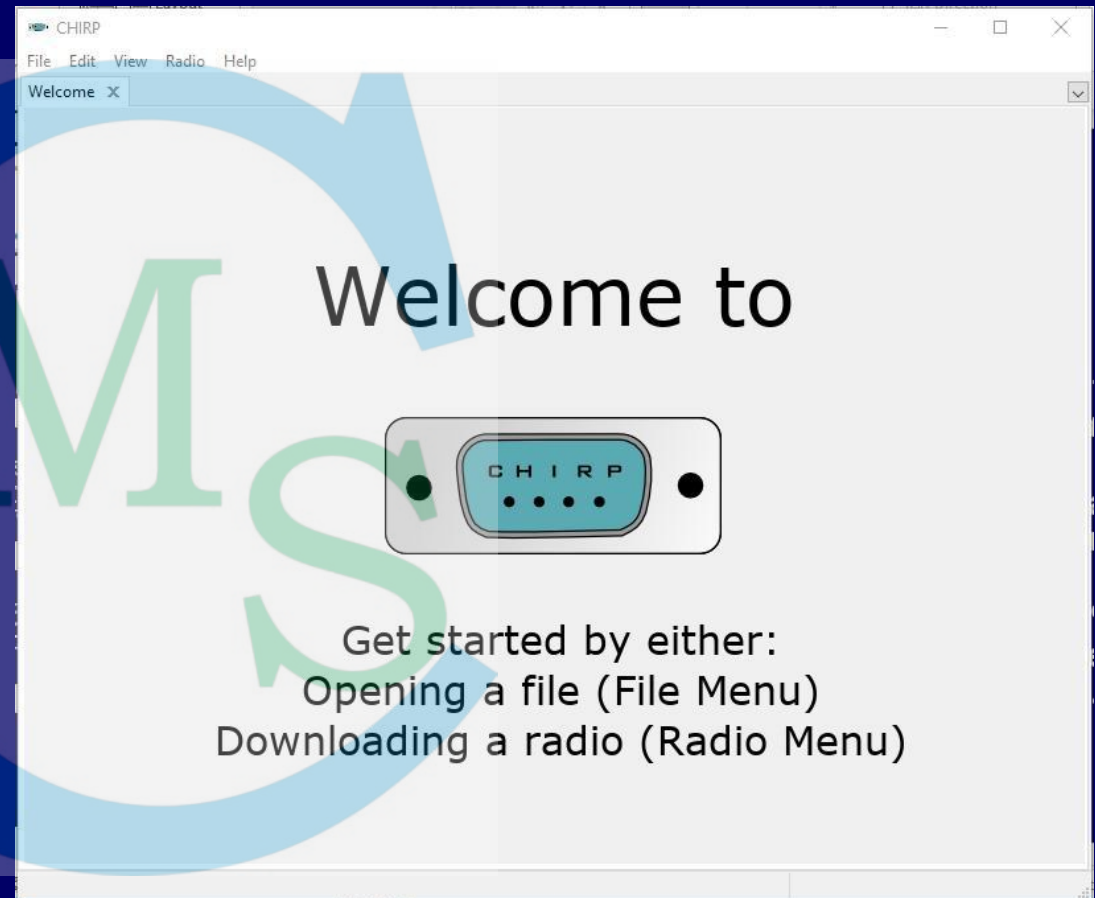
On First Launch

- When you run CHIRP for the first time after a new or fresh install, you will be presented with a license agreement dialog.
- Read the message, and then click “Agree” if you do agree and choose to use the software.
- It *may* be pre-empted by an update notice...



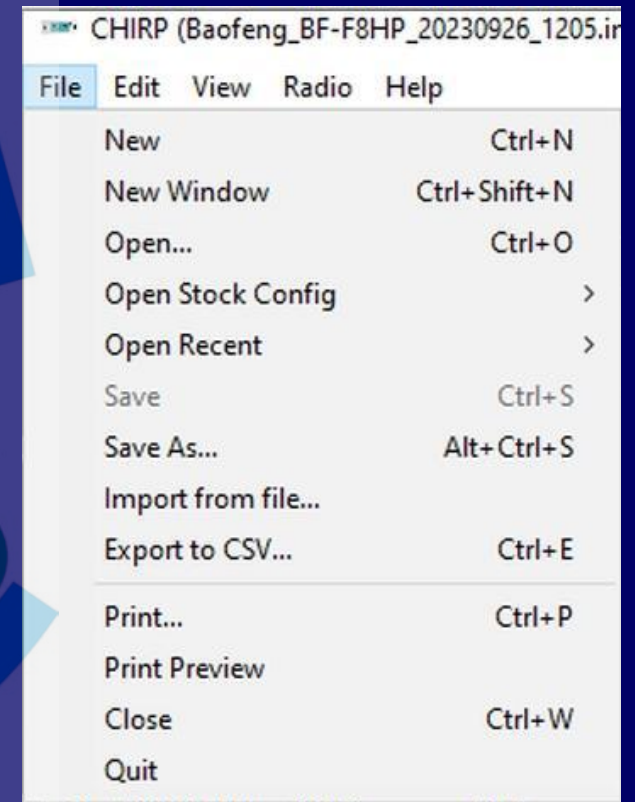
The CHIRP Screen

- The Welcome screen is the start-up launching point.
- Five menus are available...
 - File
 - Edit
 - View
 - Radio
 - Help
- Each of these menus will be discussed and explained in detail...
- Note the keyboard shortcuts!



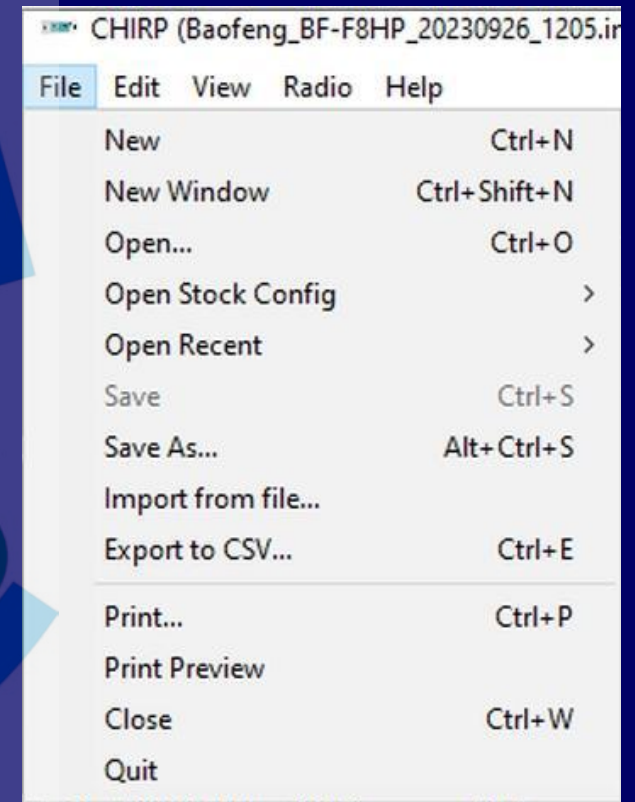
File Menu

- New... opens a new, blank CHIRP file and grid
- New Window... opens an additional instance of CHIRP in another application window
- Open... provides a dialog to allow the user to open an existing CHIRP .IMG file
- Open Stock Config... provides the user a choice of existing pre-defined frequency sets
- Open Recent... provides a list of the most recently used CHIRP .IMG files for quick re-opening of those files



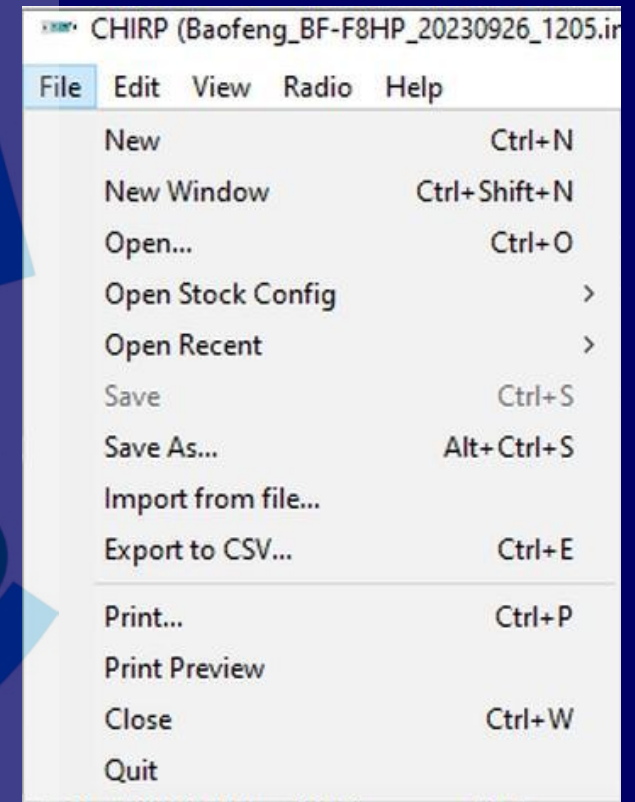
File Menu

- **Save...** allows the user to save an already-named .IMG file to disk
- **Save As...** allows the user to save a CHIRP .IMG file to a new filename
- **Import from file...** permits the inclusion of CHIRP data from a disk file into the open radio tab
- **Export to CSV...** provides a data dump of the CHIRP grid into a comma separated values text file
- **Print...** sends the screen contents to the default printer via the print dialog



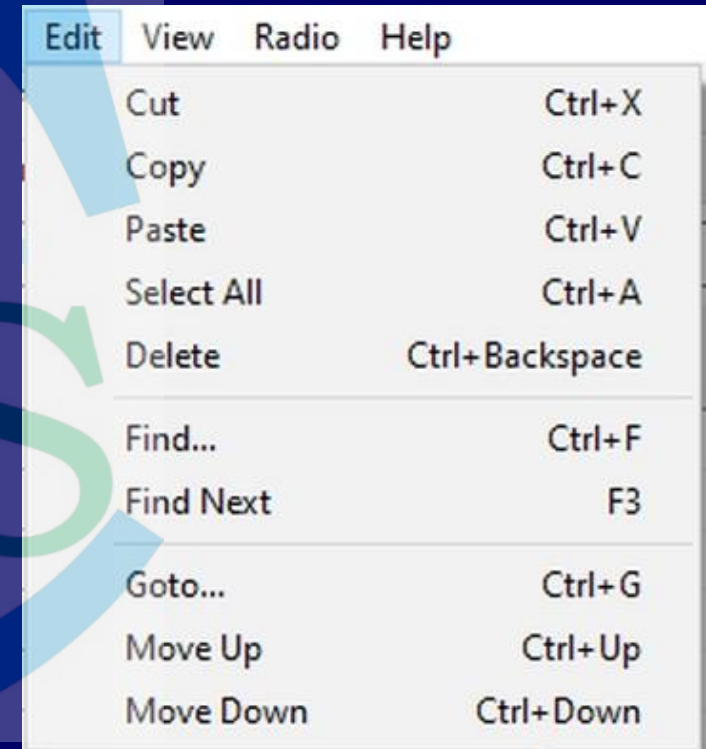
File Menu

- **Print Preview...** allows the user to see how the printed output will appear
- **Close...** Closes the active CHIRP .IMG file
- **Quit...** exits and ends the program



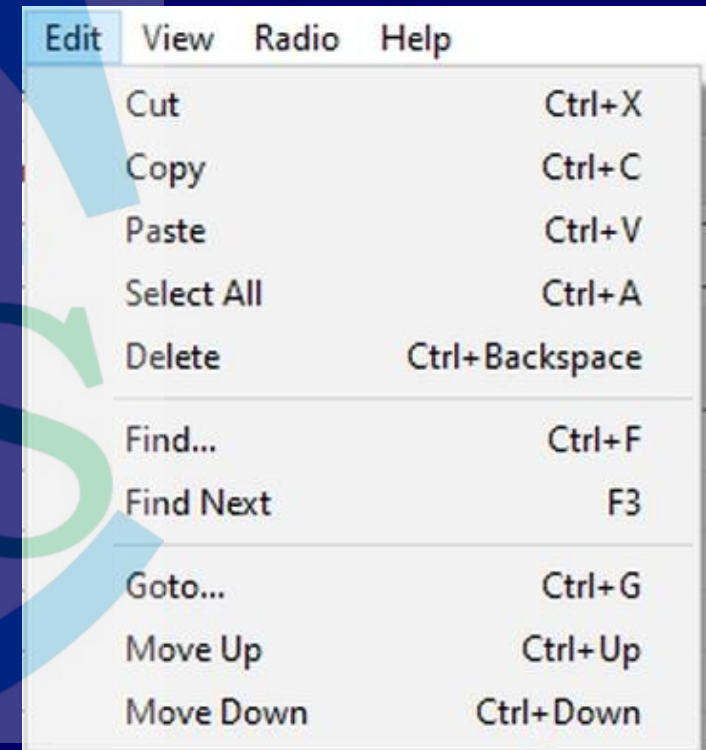
Edit Menu

- **Cut...** removes the selected text from the grid and places it on the clipboard
- **Copy...** places the selected text on the clipboard without removing it from the grid
- **Paste...** Places the text on the clipboard into the selected location in the grid
- **Select All...** Selects all text in the grid



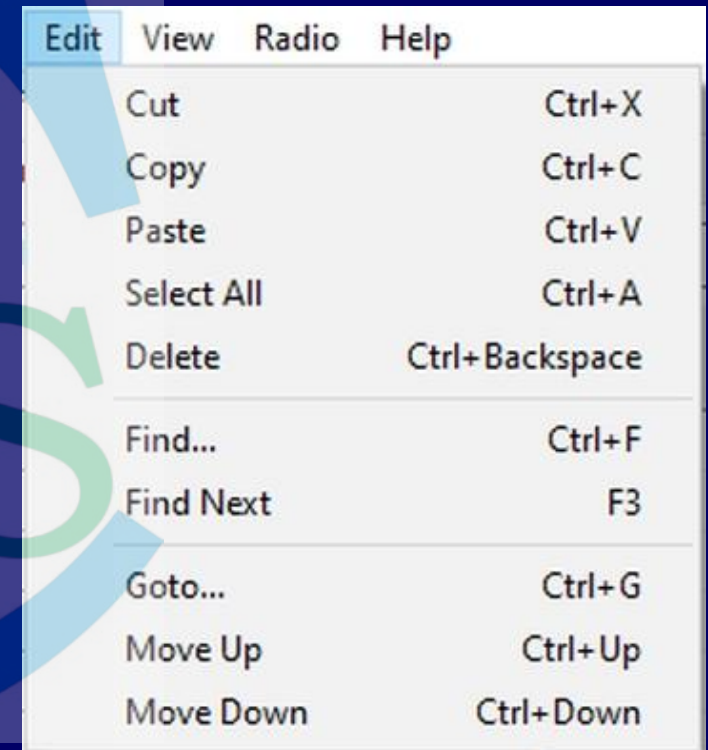
Edit Menu

- Delete... removes the selected text from the grid and discards it
- Find... executes a search routine to locate the cited text in the grid
- Find Next... repeats a search routine to locate the next occurrence of the cited text in the grid
- Goto... jumps the focus to a given memory slot in the grid



Edit Menu

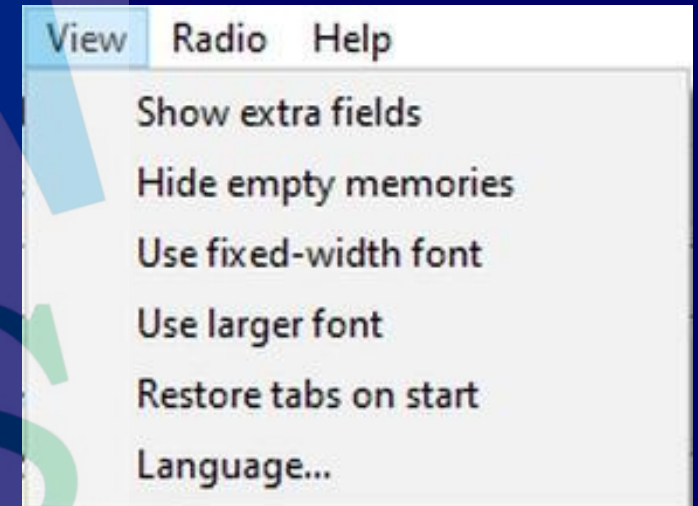
- Move Up... shifts the selected line upward in the grid, displacing others downward
- Move Down... shifts the selected line downward in the grid, displacing others upward



View Menu

The *View* menu has grown since its initial inclusion in the user interface, and now offers six menu options...

- Show extra fields... this is a toggle item that controls the display of or hiding of some additional data fields which vary by radio make and model
- Hide empty memories... another toggle item that controls the display of or hiding of grid rows that do not contain data

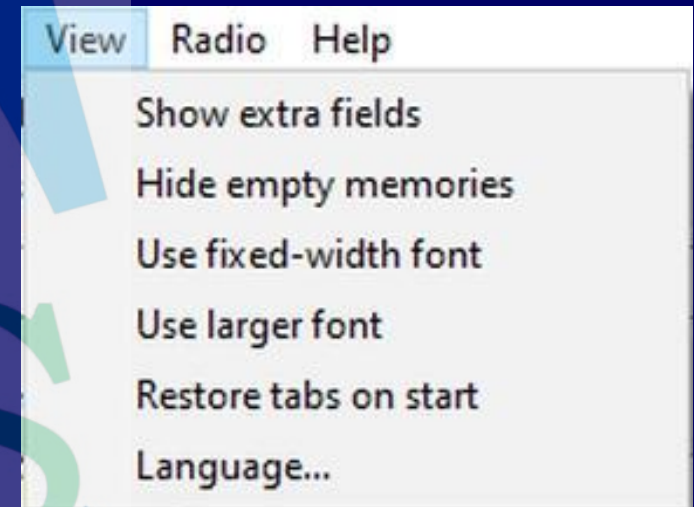


View Menu

The *View* menu has grown since its initial inclusion in the user interface, and now offers six menu options...

- Use fixed-width font... toggle item that instructs the interface to use a font with consistent character spacing rather than the native Windows font
- Use larger font... toggle item that magnifies the text size in the user interface

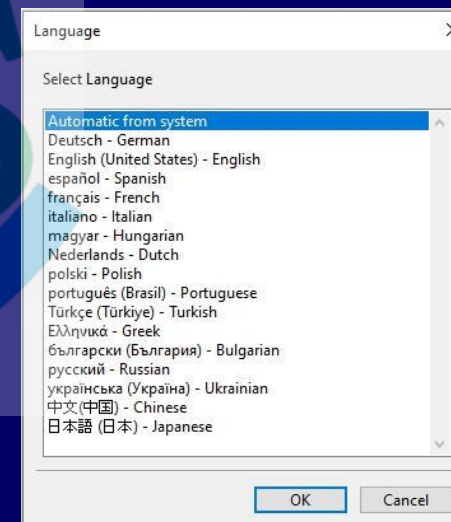
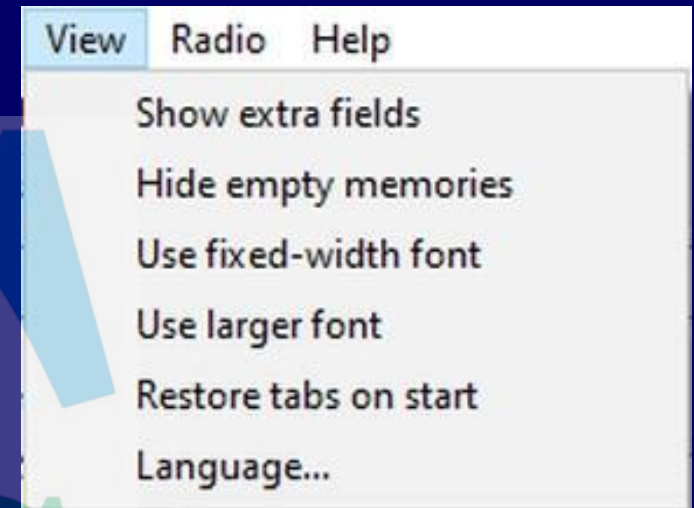
Note that the two “font” menu items here can be toggled on, meaning that the font will be changed to a fixed-width font *and* it will be magnified. They can also be used separately.



View Menu

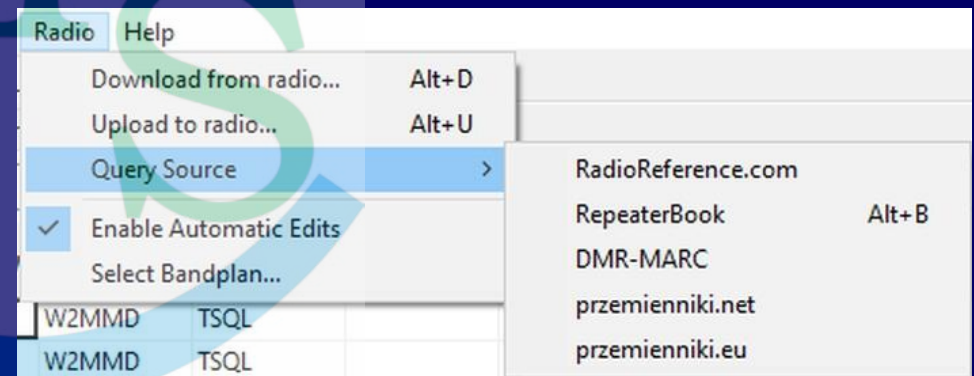
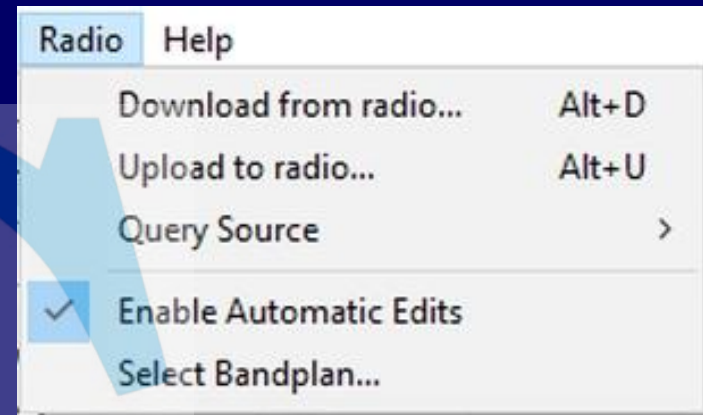
The *View* menu has grown since its initial inclusion in the user interface, and now offers six menu options...

- Restore tabs on start... instructs CHIRP to re-open any tabs that were open at the point in time when CHIRP was shut down
- Language... provides a long list of available translation languages in which to operate CHIRP



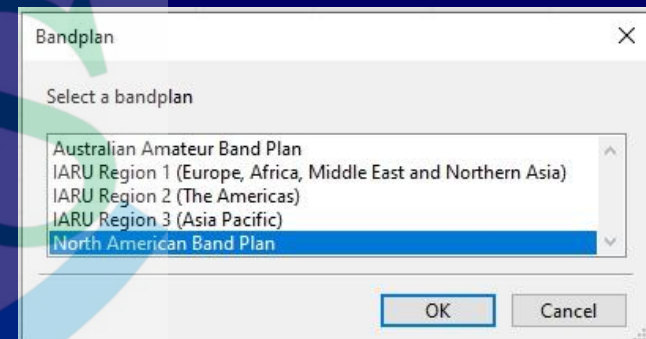
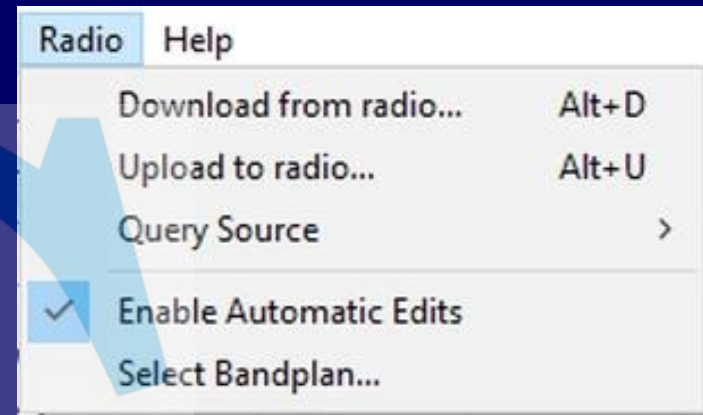
Radio Menu

- Download from radio... launches the dialog that allows cloning the radio into the software
- Upload to radio... launches the dialog that allows cloning the software values into the radio
- Query source... allows the user to obtain a list of frequencies from several well-known data sources



Radio Menu

- **Enable Automatic Edits...** toggles the software's ability to make text entries autonomously as regards offset, offset direction, and mode
- **Select Bandplan...** selects one of five defined bandplans for use with the software



About the Main Screen

- Note that when CHIRP is opened, it creates a default top-level tab with an almost empty memory grid on a single lower-level *Memories* tab
- Downloading from a radio or opening a CHIRP .IMG file creates an additional upper-level tab for each radio downloaded or file opened
 - These upper-level tabs will often have two or more lower-level tabs including at least a *Memories* tab and usually a *Settings* tab
- Each import from a data source will also create a new upper-level tab
- **Always be aware of which upper-level tab is being edited!**

The CHIRP Memory Grid

CHIRP (Baofeng_BF-F8HP_20230926_1205.img)

File Edit View Radio Help

Baofeng_BF-F8HP_20230926_1205.img

Memories Settings

Filter...

	Frequency	Name	Tone Mode	Tone	Tone Squelch	DTCS	RX DTCS	DTCS Polarity	Cross Mode	Duplex	Offset/TX Freq	Mode	Skip	Power	Comment
0	147.180000	W2MMD	TSQL		131.8					+	0.600000	FM		High	
1	147.180000	W2MMD	TSQL		131.8					+	0.600000	FM		High	
2	145.290000	K2AA	TSQL		91.5					-	0.600000	FM		High	
3	441.050000	W2MMD								+	5.000000	FM		High	
4	442.100000	W2MMD	TSQL		131.8					+	5.000000	FM		High	
5	449.975000	W2FHO	TSQL		131.8					-	5.000000	FM		High	
6	147.120000	KC2DUX	TSQL		123.0					+	0.600000	FM		High	
7	440.106250	KD2LNB								+	5.000000	FM		High	
8	146.865000	K2UK	TSQL		131.8					-	0.600000	FM		High	
9	442.350000	K2UK	TSQL		131.8					+	5.000000	FM		High	
10	147.225000	WA2WUN	TSQL		192.8					+	0.600000	FM		High	
11	145.390000	K2DX	TSQL		91.5					-	0.600000	FM		High	
12	440.243750	K2EOC								+	5.000000	FM		High	
13	447.775000	NJ2GC	TSQL		146.2					-	5.000000	FM		High	
14	147.895000	K2EOC	Tone	91.5						-	0.600000	FM		High	
15	445.031250	N2SRQ								-	5.000000	FM		High	
16	444.300000	WB3EHB	TSQL		131.8					+	5.000000	FM		High	
17	448.025000	N2HQX	TSQL		131.8					-	5.000000	FM		High	
18	145.370000	NJ2CH	TSQL		91.5					-	0.600000	FM		High	
19	444.900000	K3RJC	TSQL		131.8					+	5.000000	FM		High	
20	145.150000	K2AX	TSQL		91.5					-	0.600000	FM		High	
21	147.345000	WA3BXW	TSQL		127.3					+	0.600000	FM		High	
22	442.300000	KA2PFL	TSQL		131.8					+	5.000000	FM		High	
23	147.540000	HAMFST										FM		High	
24	147.180000	W2MMD	TSQL		131.8					+	0.600000	FM		High	
25	147.120000	KC2DUX	TSQL		123.0					+	0.600000	FM		High	
26	146.745000	K2BP	TSQL		146.2					-	0.600000	FM		High	

Baofeng BF-F8HP

Memory Grid Columns

- Frequency... the receive frequency of the programmed station
- Name... an alphanumeric identifier applied to the programmed station
- Tone Mode... the access tone methodology employed by the programmed station
- Tone... the access tone frequency for basic Tone mode – used on TX only
- Tone Squelch... the access tone frequency used for Tone Squelch mode – used on both TX and RX

Memory Grid Columns

- DTCS... the DTCS code to be transmitted and used for receiver squelch when the Tone Mode is set to DTCS
- RX DTCS... sets the DTCS code to be used for RX if radio-supported and Tone mode is set to Cross
- DTCS Polarity... sets the polarity of the transmitted DTCS code
- Cross Mode... controls squelch behavior when Tone mode is set to Cross
- Duplex... sets the duplex mode for the programmed station, either off, +, -, or split

Memory Grid Columns

- Offset... sets the frequency difference between RX and TX frequencies in Duplex mode
- Mode... controls the RX and TX mode of operation for the programmed station, either FM, NFM, WFM, AM, or DV
- Skip... sets the programmed station as either a priority channel (P) or a skipped channel (S) during scanning
- Power... sets the RF output power of the programmed station
- Comment... an alphanumeric note regarding the programmed station

“EXTRA” Memory Grid Columns

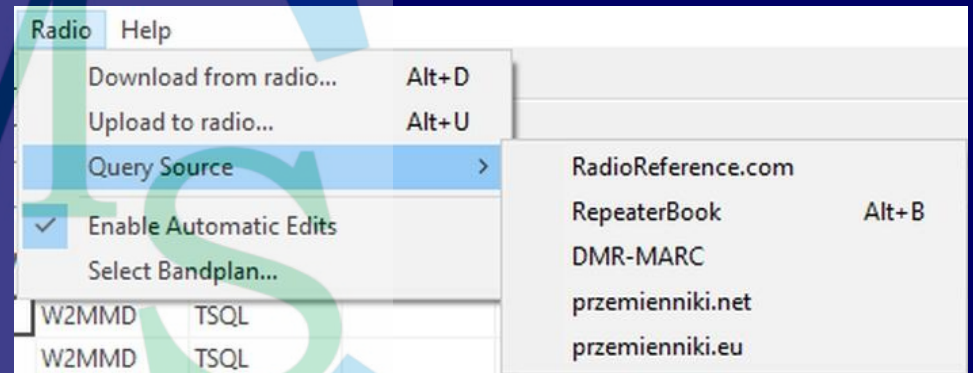
- BCL... *Busy Channel Lockout* – instructs the radio not to allow TX operations on the selected channel if the channel is busy with an active transmission, thus preventing the likelihood of “doubling”
- PTT ID... instructs the radio to transmit an embedded unique numerical code on every action (open or close) of the PTT switch
- PTT ID Code... shows the specific unique numerical identifier that is assigned to the selected channel – these numerical codes are also known as ANI codes (*Automatic Number Identification*)

Making Grid Entries

- The memory grid can be edited manually or via cut-and-paste operations from other parts of the grid or from another open radio grid.
- When Automatic Editing is enabled, portions of the grid line will be entered automatically when the frequency is entered, based upon that frequency and the customary norms.
- Earlier versions of CHIRP allowed “hiding” of unused columns, but that feature is no longer available.
- Any unused column in a given grid line should simply be left empty.

Working with Data Queries

- As mentioned during the menu run-through, we have the ability to draw data from several external sources.
- While all of these sources can be helpful, by far the one most used will be the option for “*RepeaterBook*”.
- The “*Alt + B*” key combination will launch the *RepeaterBook* data query form.



Working with Data Queries

- We fill out the query form with the information required to derive the data that we want from *RepeaterBook*.
- When we click “OK”, CHIRP will pull the pertinent data from RepeaterBook and will enter that data into a new tab.
- The user must then copy and paste the desired data lines into the tab for the radio being programmed.
- The data options for selection are quite broad and flexible, allowing generous search capabilities.

Query Repeaterbook

RepeaterBook is Amateur Radio's most comprehensive, worldwide, FREE repeater directory.
repeaterbook.com

Country: United States

Service: Amateur

State/Province: Alaska

Latitude: Optional: 45.0000

Longitude: Optional: -122.0000

Distance: Optional: 100

Filter: Optional: County, Hospital, etc.

Limit Bands: ☐ Only certain bands

Limit Modes: ☐ Only certain modes

Limit use: ☐ Open repeaters only

Digital Modes: ☐ Convert to FM

[Include Cached](#) ☐ Results from other areas

OK Cancel

About COM Ports

- Microsoft Windows will assign virtual communications (COM) port numbers to each instance of an active USB communications device that can emulate a standard communications port.
- Moving a USB device from one USB port to another will generally cause Windows to create a new COM port number for the device in its new location.
- Selecting the wrong COM port number in the *Radio> Upload...* or *Radio > Download...* dialog will cause an error, which will prevent the operation from completing successfully.

Cloning From A Different Radio

To build a memory list based on the entries in a different radio...

1. Download the data from the source radio and optionally save that data as a CHIRP .IMG file
2. Connect the target radio and download its data (or open a CHIRP .IMG file appropriate for the target radio)
3. Select (highlight) and copy (Ctrl+C) the rows of data in the source radio memory tab to be cloned into the target radio
4. Click into the target radio memory tab and choose the destination location rows for the new rows of data
5. Paste (Ctrl+V) the data into those rows
6. Upload the new data to the target radio

Downloading from Radio

To download data from a radio...

1. Connect the radio to the PC and ensure that it is ready to clone
2. Click *Radio > Download from radio*
3. Select the correct COM port
4. Select the correct radio make and model
5. Click *OK* to begin download

Uploading to Radio

To upload data to a radio...

1. Connect the radio to the PC and ensure that it is ready to clone
2. Click *Radio > Upload to radio*
3. Select the correct COM port
4. Select the correct radio make and model
5. Click *OK* to begin upload

About Uploading...

- CHIRP will not permit uploading of unformatted data to a radio.
 - The data must be entered into a memory grid that is formatted for the specific radio make and model into which the user desires to upload the data.
 - A formatted memory grid can be obtained by either one of two methods...
 - Download the existing format from the target radio, or
 - Open a CHIRP .IMG file that is formatted for that particular radio make and model.
- The radio make and model for which a CHIRP .IMG file is formatted will appear as a part of the automatically-generated filename of the .IMG file.
 - It is *highly* recommended that the filename assigned by the software always be accepted with the addition of the save time to the end of the filename, such as ***Baofeng_BF-F8HP_20230429_2008.img***.

Working with the Data

CHIRP (Baofeng_BF-F8HP_20230926_1205.img)

File Edit View Radio Help

Baofeng_BF-F8HP_20230926_1205.img x

Memories Settings

Filter... **← Filter query line**

	Frequency	Name	Tone Mode	Tone	Tone Squelch	DTCS	RX DTCS	DTCS Polarity	Cross Mode	Duplex	Offset/TX Freq	Mode	Skip	Power	Comment
0	147.180000	W2MMD	TSQ		131.8					+	0.600000	FM		High	
1	147.180000	W2MMD	TSQ		131.8					+	0.600000	FM		High	
2	145.290000	K2AA	TSQ		91.5					-	0.600000	FM		High	
3	441.050000	W2MMD								+	5.000000	FM		High	
4	442.100000	W2MMD	TSQ		131.8					+	5.000000	FM		High	
5	449.975000	W2FHO	TSQ		131.8					-	5.000000	FM		High	
6	147.120000	KC2DUX	TSQ		123.0					+	0.600000	FM		High	
7	440.106250	KD2LNB								+	5.000000	FM		High	
8	146.865000	K2UK	TSQ		131.8					-	0.600000	FM		High	
9	442.350000	K2UK	TSQ		131.8					+	5.000000	FM		High	
10	147.225000	WA2WUN	TSQ		192.8					+	0.600000	FM		High	
11	145.390000	K2DX	TSQ		91.5					-	0.600000	FM		High	
12	440.243750	K2EOC								+	5.000000	FM		High	
13	447.775000	NJ2GC	TSQ		146.2					-	5.000000	FM		High	
14	147.895000	K2EOC	Tone	91.5						-	0.600000	FM		High	
15	445.031250	N2SRQ								-	5.000000	FM		High	
16	444.300000	WB3EHB	TSQ		131.8					+	5.000000	FM		High	
17	448.025000	N2HQX	TSQ		131.8					-	5.000000	FM		High	
18	145.370000	NJ2CH	TSQ		91.5					-	0.600000	FM		High	
19	444.900000	K3RJC	TSQ		131.8					+	5.000000	FM		High	
20	145.150000	K2AX	TSQ		91.5					-	0.600000	FM		High	
21	147.345000	WA3BXW	TSQ		127.3					+	0.600000	FM		High	
22	442.300000	KA2PFL	TSQ		131.8					+	5.000000	FM		High	
23	147.540000	HAMFST										FM		High	
24	147.180000	W2MMD	TSQ		131.8					+	0.600000	FM		High	
25	147.120000	KC2DUX	TSQ		123.0					+	0.600000	FM		High	
26	146.745000	K2BB	TSQ		146.2					-	0.600000	FM		High	

Baofeng BF-F8HP

Working with the Data

- There is now a query-based filter function that is available for operation on the populated data grid.
- This tool permits searching of the data for specific values...

Operation	Example	Result
Find specific frequency	freq=146.52	Display memories with frequency of 146.52MHz
Find range of frequencies	freq<144,148>	Display memories with frequency between 144-148MHz
Find only D-STAR memories	mode="DV"	Display memories that have "DV" in the mode column
Find only airband memories	mode="AM" and freq<118,134>	Display memories that are AM and between 118-134MHz
Find name containing string	name~"mountain"	Display memories with "mountain" in the name
Find exact name	name="W1AW"	Display memories with name exactly matching "W1AW"

Working with the Data

- Various keywords are available, including...

freq	mode
name	tmode
ctone	comment
rtone	lo
hi	
- Boolean operators *and*, *or*, *=*, and *~* are permitted in filter expressions
- This is a powerful tool for mining the data for specific information
 - *Example:* the string `freq<144,148>` returns all entries with frequencies in that range, or from 144MHz to 148MHz

Other Radio Settings

- Depending upon the radio make and model, there will usually be two lower-level tabs showing under the radio's upper-level tab in CHIRP
- The first lower-level tab is the *Memories* tab
- The second lower-level tab is the *Settings* tab, as shown at right



- The options available on the *Settings* tab will vary from one radio to the next
- These are the radio “personality” settings

Things to remember

- It is always advisable to save the downloaded data from a new radio so that it can be restored later if necessary
 - Click *File > Save As* to save the CHIRP .IMG file
- CHIRP can import .CSV files, but they cannot be directly uploaded
 - Data from a .CSV file must be entered into a radio-formatted memory grid in order to upload it
- CHIRP can also export its data to a CSV file for use in other applications
- CHIRP can open numerous different radio file types, all found in the *File > Open* dialog in the file types drop list

Things to remember

- Sometimes, a radio must be listed as a different make and/or model radio in order for CHIRP to program it successfully
 - A Google search for “CHIRP” and the radio make and model will often turn up the necessary information.
- Always be sure that the data cable is fully seated into the jack(s) on the radio
- Always make sure that the operating system recognizes the radio and has assigned a COM port value to it
- Switching USB ports will usually garner a new COM port designation for a given data cable

Things to remember

- Data in the *Memories* tab can be edited directly in the grid, or can be edited in a pop-up window that will appear if the grid row is right-clicked, and *Properties* is chosen from the context menu that appears.
- That same context menu will allow some manipulation of the data rows...
 - ...insertion of a blank row above the current row(s)
 - ...deletion of the current row(s)
 - ...sorting of the data, ascending or descending, in the current row(s)
 - ...display of the raw memory contents (useful for development team)

Things to remember

- Double-clicking most cells in the memory grid will launch a drop list of available optional values for that cell
- Selecting a value in this way will also change the underlying data structure
 - ...e.g., if you have set the Tone mode to Tone, but then select a value in the DCS cell for that row, the Tone mode will be automatically changed, **even if the *Enable Automatic Edits* option is toggled off**
- Use this method carefully until you are well acclimated to its behavior to avoid erroneous values from appearing in the grid
- It is always advisable to append the save time to the automatic file naming convention so as to differentiate between multiple files saved on the same day

Time to Update...

- When launching CHIRP, you may be presented with a screen that looks like the image at right.
- This means that a new “daily” file is available for installation.
- When you click OK, you will receive another message with a reminder about the install procedure.
- Clicking OK again will take you to the CHIRP website download page.

