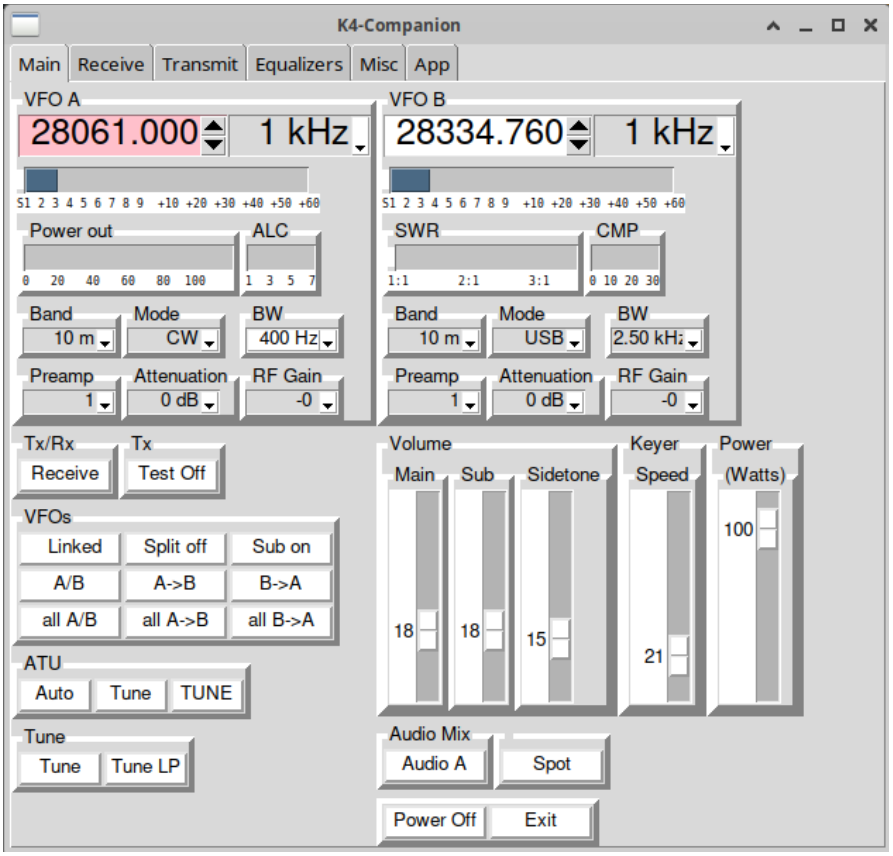
K4 Companion

An application for remote control of Elecraft the K4 series SDR transceiver



VFO A
28061.000 1 kHz
Band 10 m
Mode CW
BW 400 Hz
Preamp 1
Attenuation 0 dB
RF Gain -0

VFO B
28334.760 1 kHz
Band 10 m
Mode USB
BW 2.50 kHz
Preamp 1
Attenuation 0 dB
RF Gain -0

Developed by Dale Farnsworth, W7DA

Based on a simple utility originally devised by Charles Powell, NK8O

Revision date: April 17th, 2025, based on version 1.2.0

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Introduction

K4 Companion is an application written in python3 that can remotely control an Elecraft K4 transceiver via TCP/IP. It currently controls the main K4 features and is very usable as is, but new features are being added all the time. K4 Companion is very configurable.

K4 Companion began life as a simple macro-sending program called K4Macro-Python, created by Charles Powell, NK8O. It has now grown far beyond a simple macro-sending program into a full-fledged remote control program for the K4.

Please send problem reports either: by sending an email, by entering an issue on github, or by making a pull request. Problem reports and suggestions are greatly appreciated.

Configuration information is maintained in a separate YAML file named, by default, k4companion.yaml. Custom configurations can be loaded with the *–config* option between the python executable and the desired configuration file.

Dale Farnsworth, W7DA
dale@farnsworth.org

License

Installation on Linux

One of the beauties of open source software is that it is typically cross-platform. Using Python3, the application is available on any platform that has Python3 available. It was developed on Linux, but it has now been successfully ported to both Mac OS, and Windows.

Here are the items one needs to take full advantage of K4 Companion and all its features:

1. You must have a way to turn your radio on remotely. This is detailed in the K4 user manual (pages 17 & 18) and requires the momentary closure and grounding of pin 8 to pin 5 on the DB15 ACC connector. Unfortunately the Wake On LAN feature is not available for the K4, at least not at this time. Other details are beyond the scope of this document. Nonetheless, there are many operators who simply leave the radio on at all times.
2. A computer capable of running a full installation of Python is needed. This has been tested with Xubuntu, Debian 12, Chromebook, and various iterations of the Dell XPS series running a variety of installations.
3. Install portaudio (*sudo apt install portaudio19-dev* on Debian based distributions)
4. Install Python3. This is pre-installed on most Linux distributions. Please refer to readily available documentation for installation on other operating systems.
5. Install 'python-tk' *(sudo apt install python3-tk* on Debian based distributions)
6. Install 'pip3', required for the remaining dependencies *(sudo apt install python3-pip)*
7. Install 'pyyaml' using pip
8. Install 'opuslib' for audio support using pip
9. Install 'numpy', and 'pyaudio' with using (Some of these may be pre-installed) portaudio is required for pyaudio to install correctly
10. Install 'PySocks' with pip. This allows SOCKS 5 proxy connections

Notes: the typical installation of Python dependencies is with the command *pip install xxxxx* however security consciousness has caused the need for override with a number of operating systems. If your OS complains about installing the extras, use the command *pip install –break-system-packages xxxxx* . It doesn't really break anything. It installs the package in the individual user's profile. I have done many such installs and it has never been a problem. Incidentally the *pip* command can be used to install '.whl' Python files. Chirp, the well known open source HT programming software is provided this way, and using the .whl file is an easy way to keep up with changes and updates.

Although it has not been tested on Mac OS, if you are experimenting you **must** install Python 3 because the default version is Python 2, and it is deprecated. When installing the pip dependencies you **must** specify *pip3* or you will get Python 2 files that won't work. **Background colors** do not work under Mac OS. Buttons that have background colors unfortunately do not change on Mac OS. The most recent versions have been tested on Mac OS and they work quite well.

Starting with version 1.1.40, the version number is now displayed in the title bar.

The latest version is available **here**: https://github.com/DaleFarnsworth/K4-Companion/

Windows Installer & Binaries

Two options are available those who do not wish to create a full installation of Python3 or to examine the open source code. A Windows installer and Windows binary executable files are now available. The automated installer that places all items in the proper directory, creates a Start Menu entry, and it also will create a desktop shortcut if that option is selected. Double click the installer, then select the desired options. The user manual is also provided, found in $PROFILE/k4companion/

If preferred, a manual install is possible. There are three files that are needed to run under the Windows operating system. K4 Companion has been tested on Windows 11 and Windows 10.

The three files, available on the github download page are:

- k4companion.exe
- k4companion.yaml
- opus.dll

The two k4companion files should be placed in a directory (folder) of your choice. These need to be placed in the same directory (folder). The DLL, opus.dll, should be placed in C:\Windows\System32\ . You will need **administrator permission** to place opus.dll. Either cmd or PowerShell can be used for this purpose.

The configuration file, k4companion.yaml, remains fully editable with the same cautions noted above.

A note regarding Windows Defender: The Defender reaction will range from none at all, to identifying K4 Companion as a virus. If identified as a virus, Defender will quarantine the executable and ask if you want to delete it. Instructions regarding bypassing Windows Defender are found at https://answers.microsoft.com/en-us/windows/forum/all/how-to-allow-an-ap-through-windows-defender/caab364c-9e65-448e-8635-98721be847ba

Starting with version 1.1.40, the version number is now displayed in the title bar.

Full Installation on Windows

Installation on Windows follows the same principles as Linux. It is quite similar, once Python3 is installed. **NOTE:** Windows binaries are available. See Page 5.

Here are the basic step:

1. As with Linux, you must have a way to turn your radio on remotely. This is detailed in the K4 user manual (pages 17 & 18) and requires the momentary closure and grounding of pin 8 to pin 5 on the DB15 ACC connector. Unfortunately the Wake On LAN feature is not available for the K4, at least not at this time. Again, there are many operators who simply leave the radio on at all times.
2. A computer capable of running a full installation of Python is needed. Windows 11 is the platform upon which testing has been done. With Windows 10, things may or may not work well.
3. Install Python3 https://www.python.org/downloads
4. Update pip *python -m pip install –upgrade pip*
5. Install numpy *pip install numpy*
6. Install opuslib *pip install opuslib*
7. Install pyaudio *pip install pyaudio*
8. Install socks support *pip install pysocks*
9. Install YAML support *pip install pyyaml*
10. From Contributions on the K4 Companion github site, download opus.dll and move it to the folder C:\Windows\System32

Download k4companion and k4companion.yaml from the github site. Place them in a convenient folder. I suggest using PowerShell to use to open k4companion. It allows the use of the Ampersand, like Linux, to fork a process into the background and gives a little more flexibility. One caveat: if you close PowerShell or your cmd program on a running version of K4 Companion, it will exit the program.

The utility is being tested on Windows and it is under development. Some known quirks are that the extensions are incorrectly assigned. The main file may downloads with the '.txt' extension and it should be '.py', if anything. Windows also wants to drop the '.yaml' extension. It is best in both instances to specify the extension when the downloads are saved. If you have missed any of the dependencies, Python is very good at telling you what it needs.

Starting with version 1.1.40, the version number is now displayed in the title bar.

The latest version is available **here**: https://github.com/DaleFarnsworth/K4-Companion/

MacOS

Development on MacOS has been challenging. Binaries are not practical, due to Apple's security policies. Every library that is compiled into an executable throws an error. Development of a MacOS binary has been abandoned, at least for the time being.

There are a few quirks between Python3 and MacOS. Background colors and active colors do not work on the widgets. All python references must be *'python3'* and all all pip references must be *'pip3'*

More to come.

Starting with version 1.1.40, the version number is now displayed in the title bar.

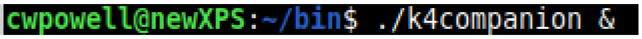
Running K4 Companion

There are essentially two ways to run a Python script. To execute the script directly, it requires the file to marked as executable. Under Linux and Mac OS, this is done after downloading the script. In a terminal window and using the command line, issue the command *chmod 755 k4companion* . It is not necessary to make any modifications or change permissions of the YAML file. The YAML file should be in the same directory or folder as the *k4companion* executable. Otherwise, the command line becomes complicated.

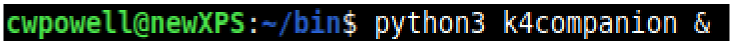
Methods for starting K4 Companion:

- Assuming the file has been made executable, from a Linux terminal window issue the command *./k4companion & (enter)* from the directory or folder where the script, as well as the configuration file are located. This will work with the "stock" configuration YAML. To use a custom configuration, use *./k4companion --config my_k4companionfile.yaml & (enter)*
- The alternative method, which requires no modifications nor marking files as executable is as follows: *python k4companion & (enter)*. The same approach can be used here for a custom YAML file
- For the Windows binary, simply click on k4companion.exe or highlight and press ‘e*nter*’

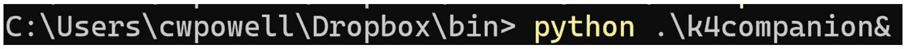
If you create a shortcut or desktop launcher K4 Companion, it must contain the full path to the executable in order to find the configuration file. When using Windows, versions of PowerShell > 6.0 allow the use of the ampersand *(&)* to fork processes into the background. Windows requires calling *python k4companion & (enter)* and does not recognize ‘*python3*’.



```
cwpowell@newXPS:~/bin$ ./k4companion &
```

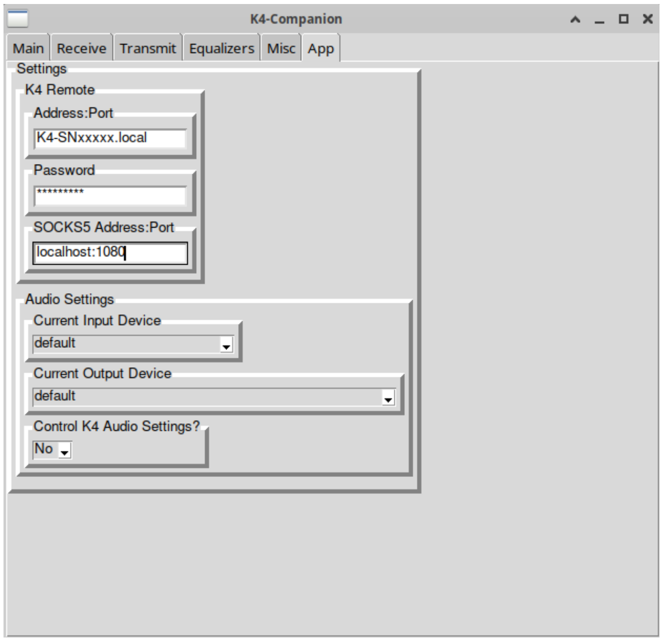


```
cwpowell@newXPS:~/bin$ python3 k4companion &
```



```
C:\Users\cwpowell\Dropbox\bin> python .\k4companion&
```

Configuration: App tab



Settings

K4 Remote

Address:Port: K4-SNxxxxx.local

Password: *********

SOCKS5 Address:Port: localhost:1080

Audio Settings

Current Input Device: default

Current Output Device: default

Control K4 Audio Settings?: No

Configuration is done through the ‘App’ tab. Configuration parameters **must** be entered but K4 Companion will save these items and open after going back to the Main tab. Items needed are:

- The remote address of the K4 to be controlled. This can either replace the ‘xxxxx’ portion with the serial number of the radio, or it can be the actual IP address of the K4
- Operation outside your LAN will require either port forwarding, an SSH “tunnel,” a VPN, or SOCKS 5 proxy. This will require a change in the IP address, depending on the configuration used or specifying the proxy server information. If you operate from a single remote address, it is possible to “open” your router to accept only that address
- The password to access your K4. For remote control this **must** be set on the radio. In addition, the number of connections to your K4 must also be specified. This can be set to one, and up to four connections allowed. No connections will be permitted if the parameter is set to zero
- K4 Companion is fully configured for SOCKS 5 proxy. Enter the proxy address and port as shown above, but only if needed. The default port is 1080 if not specified, but it can be set as above if another port is desired

Audio connections can generally be set to **default** in a typical Linux installation. Choices vary according to the Linux flavor and sound systems installed. In Windows there are a variety of settings, but generally these mention Speaker and Microphone. See **Notes on Operation** below.

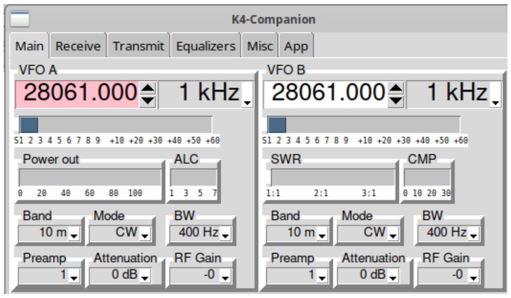
Control K4 Audio Settings? If you are using K4 Companion to control the radio while sitting in the shack, this can be set to Yes. Otherwise for remote operations, set it to No. See **Notes on Operation** below.

Once this tab is configured, the settings are saved automatically. No changes are needed unless something in your operational configuration changes.

Operation and Controls

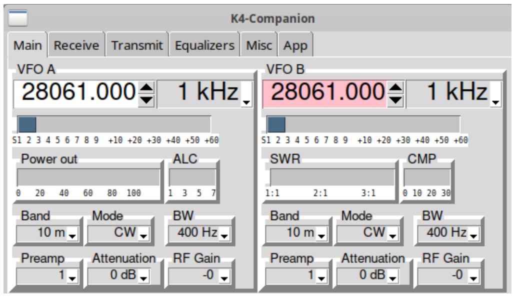
K4 Companion is logically organized with largely self-explanatory labels and functions. Each VFO can be linked, operated independently, swapped, placed into Split mode, Sub-receiver mode, or both simultaneously. Various functions are controlled in the main tab, including preamps, attenuators, RF gain, ATU functions, audio controls, keyer speed, plus sidetone volume as well as power output, and the rig can be shut down from the K4 Companion.

The active transmit window is shown in pastel pink, so it is possible to see at a glance which VFO will transmit when the radio is keyed. This prevents confusion when using Split or Sub modes.



VFO A: 28061.000 1 kHz
Power out
ALC
Band: 10 m
Mode: CW
BW: 400 Hz
Preamp: 1
Attenuation: 0 dB
RF Gain: -0

VFO B: 28061.000 1 kHz
SWR
CMP
Band: 10 m
Mode: CW
BW: 400 Hz
Preamp: 1
Attenuation: 0 dB
RF Gain: -0



VFO A: 28061.000 1 kHz
Power out
ALC
Band: 10 m
Mode: CW
BW: 400 Hz
Preamp: 1
Attenuation: 0 dB
RF Gain: -0

VFO B: 28061.000 1 kHz
SWR
CMP
Band: 10 m
Mode: CW
BW: 400 Hz
Preamp: 1
Attenuation: 0 dB
RF Gain: -0

In the image on the left, VFO A is active for transmitting, and on the right, VFO B is ready for transmit. Note on the left that the K4 is actually transmitting at 5 watts, the ALC is normal at 5, and the SWR is slightly greater than 1:1. The details available at a glance are the frequency of each VFO, the S-meter reading for each VFO (if both are active), power out either 0-10 watts or 0-110 watts, SWR, and for phone operation, compression.

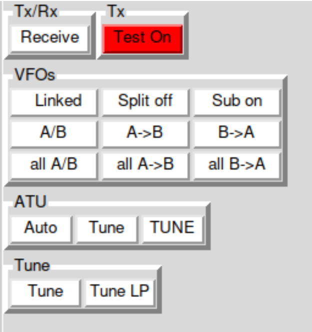
The scroll rate for each VFO can be set independently from 1 Hz to 10 kHz, and these can be modified, if desired, in the YAML file.

The VFO boxes support **direct entry**, **scrolling** with the Up←→Down arrows, or if there is a single click in the VFO box, the keyboard Up/Down buttons also allow frequency scrolling

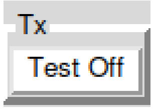
Pull-down menus are available for each VFO to set the following parameters:

- Band selection, 160 through 6 meters
- Mode selection, including all available modes for the K4 (does not include digital sub-modes)
- Bandwidth selection from 50 Hz to 5 kHz (for AM reception)
- Preamp selection – none, 1, 2, or 3 (depending on the band)
- RF attenuation in 3 dB steps up to -21 dB
- RF gain (user configurable in the YAML file but only used occasionally)

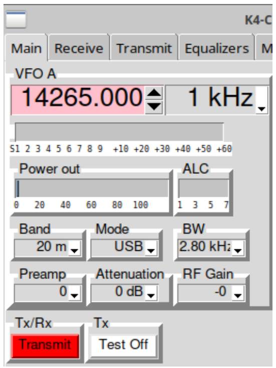
The following controls are fairly self-explanatory, at least once you are familiar with K4 Companion



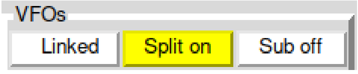
When the application opens, it sets the K4 to Test Mode, as shown above. This button lights up red when engaged but turns white when off. This prevents unintended transmission when setting up. This can be disabled at the top of the YAML file, but it is a useful feature.



Tx/Rx button has two features. If selected, the button warns that the K4 is in transmit mode, and at it turns red. Note that pressing this button does not actually put out any power. It is the equivalent of using a foot switch or pressing the PTT on the mic without actually speaking. One could use it to suppress QSK in CW mode but there is very little utility in that. QSK parameters are adjustable and the results are automatic. The button also turns red when sending CW as the transmitter is keyed.



In the next row of buttons the options are:



- Linked VFOs or Unlinked. Elecraft calls this “Band Independence”
- Split on, Split off. This button lights up yellow as a secondary warning for the change of transmit VFO, and VFO B turns pink to warn that it is now active for transmit
- Sub activates the K4 sub-receiver. This can be used either with Split mode to move the transmit VFO to B, or without. The main and sub-receivers have separate volume slider controls (see below)

The middle row of the VFO section is self-explanatory.

- Swap VFOs A/B (may be repeated consecutively)
- VFO A to B
- VFO B to A

The finals row “All” swaps or copies all parameters, equivalent to a “double tap” of the buttons on the K4.

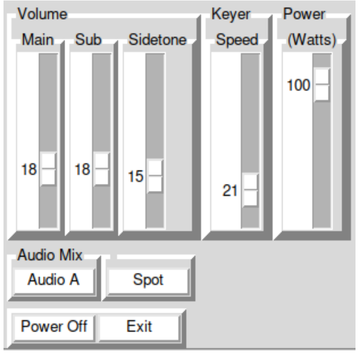
ATU controls have the following functions:

- Auto = ATU active, or Bypass
- Tune = normal ATU function (single tap)
- TUNE = extended tune (double tap)The Tune selection function in the same way the buttons on the front panel of the K4

The “Tune” buttons on the bottom row produce a continuous wave carrier

- Tune produces a carrier at the full (selected) power carrier
- Tune LP produces a low power carrier at 5 watts

Next is the bottom right hand panel segment.



The sliders control

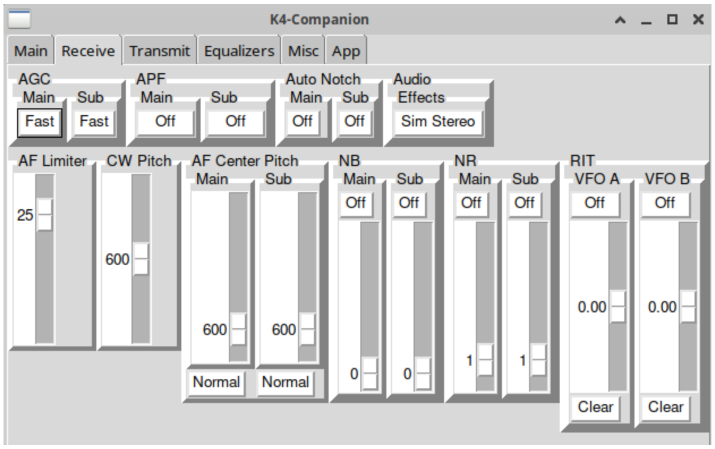
- Main volume – equivalent of the small knob on the lower left of the K4
- Sub volume – equivalent of the concentric inner knob on the lower left of the K4
- Sidetone level – useful especially if keying is done with macros or locally. Set to zero if keying is produced locally
- Power – sets power output level of the K4 from 0-110 watts

The remaining four buttons

- Audio mix selects A+B, useful in Sub mode when chasing DX, A+A = main audio only, or finally B+B = sub-receiver audio only.
- Spot will tune a reasonably strong CW signal to the chosen center frequency
- Power Off shuts down the K4 (PS0;)
- Exit closes K4 Companion but does not turn off the radio

This completes the tour of the main tab window of K4 Companion.

Receive Tab

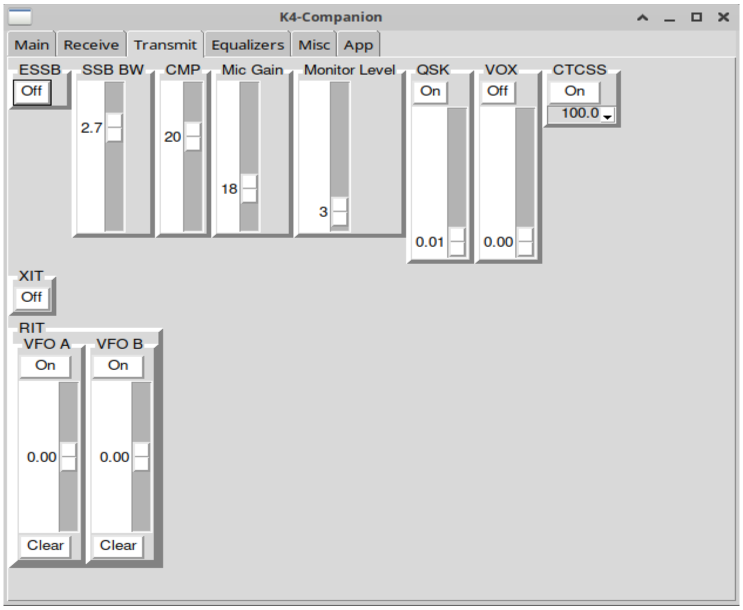


Controls for AGC, Audio Peaking filter, Auto Notch (SSB) and Audio Effects are in the top row. The function of each is explained in the K4 User Manual. Options for Audio effects include

- Simulated Stereo – introduces a slight delay in L – R audio to reduce listening fatigue
- Pitch map – moves audio from left to right as the deviation from the center frequency decreases or increases
- Off – removes all tuning and listening effects

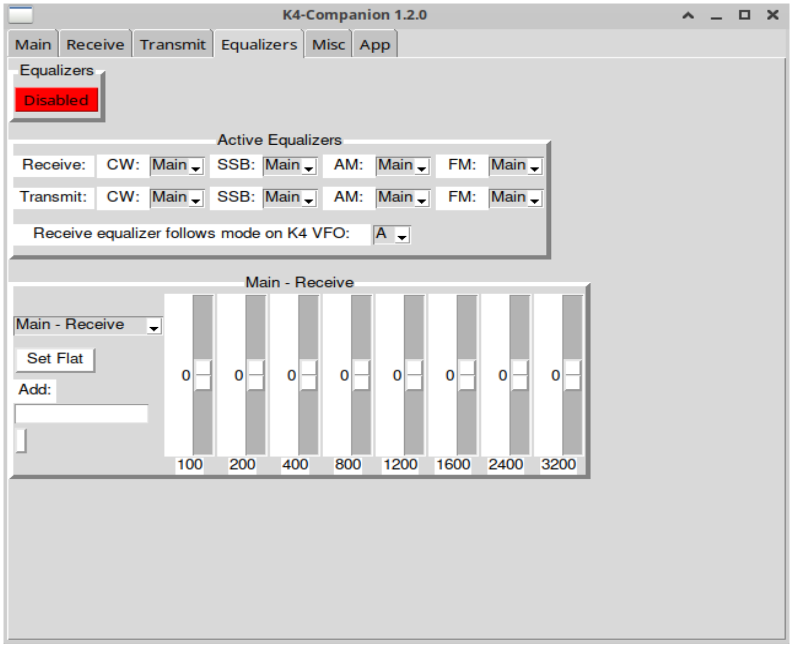
Note that the AF limiter only functions if the AGC is “Off”. This prevents extremely loud signals from blasting through at full-volume if the AGC is absent. AF Center Pitch functions by mode, and returns to the last user settings when changing modes. Noise Blanker, Noise Reduction, and RIT are explained in the K4 user manual.

Transmit Tab



- Transmit controls include ESSB (wide-band, high fidelity SSB). When selected, the SSB bandwidth varies between 3 kHz and 4.5 kHz
- SSB bandwidth for standard or CESSB (Controlled Envelope SSB) ranges from 2.4 to 2.8 kHz
- CMP, when set > 0, specifies the level of transmit audio compression
- Mic Gain – set to optimize SSB drive
- Monitor level – useful primarily if using K4 Companion for ancillary control of the radio while operating in the shack. No audio is returned when operating remotely. This control is independent of Sidetone level on the Main tab.
- QSK control On/Off and delay settings
- VOX control
- CTCSS – sets access “PL™” tones for FM repeater operation
- XIT implementation

Equalizers



Active Equalizers

Receive: CW: Main SSB: Main AM: Main FM: Main

Transmit: CW: Main SSB: Main AM: Main FM: Main

Receive equalizer follows mode on K4 VFO: A

Main - Receive

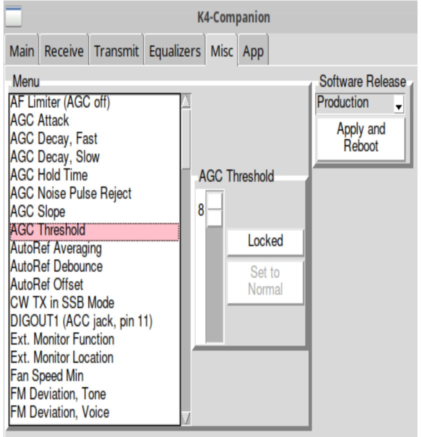
Main - Receive

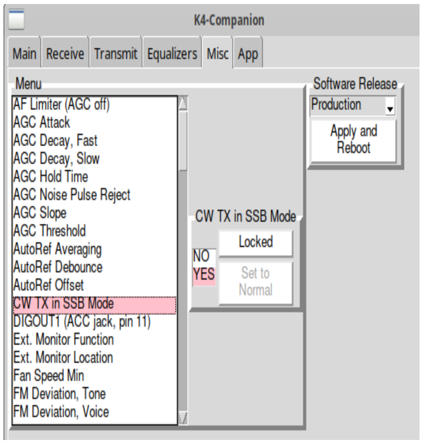
100	200	400	800	1200	1600	2400	3200
0	0	0	0	0	0	0	0

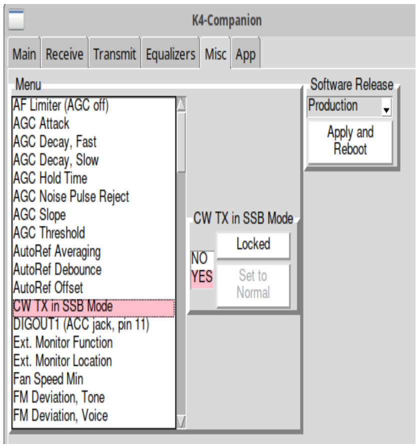
Transmit and Receive equalization can enabled or disabled, and be set by mode. These are personal preferences. Please refer to K4 forums or the K4 User Manual for recommendations.

Miscellaneous Tab

The Misc tab reproduces **all** of the menu functions of the   Update Windows/k4companion.exe to K4. These functions are covered in the user manual. The configuration menu is a long, scrollable list. When an item is selected, it appears in pink. Then a secondary widget opens that offers the menu choices. Some of these are simple YES/NO selections, others present a list, and some have a slider to select a value for the menu item.







The images show a few of the selections possible through the menu system. Please be sure to read the K4 user manual carefully. Changing menu settings without due consideration can have unexpected results.

Finally, software “Firmware” releases from Elecraft can be applied through the menu on the far right. Selections are:

- Production
- Beta
- Previous Production

Debugging

No guarantee is made that this software will run on a particular machine or distributions. However, debugging information may be useful to the developer. Information for submissions is listed on github.com by opening an problem on the “Issues” tab of the K4 Companion site. To initiate debugging, use the ‘-d’ option: *./k4companion -d -d* . This will show a running list of actions by the script onscreen. To save the debugging information to a file, use *./k4companion -d -d >> mydebugfile 2<&1&* . The debug file can be named anything you like and the file will be created if it doesn’t exist already. To append an existing log file, use *./k4companion -d -d >> mydebugfile 2<&1&*. The file can then be posted or e-mailed to Dale, W7DA.

Information from dmesg may be helpful as well: *sudo dmesg ,* although more likely if there is a system failure somewhere and not necessarily with K4 Companion.

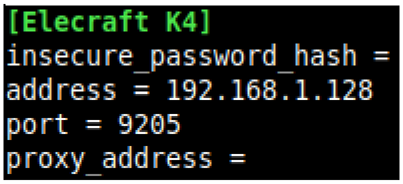
When running on Windows, the most common error seen has to do with opus.dll . The supplied DLL is 64 bit and it works on both Windows 10 and Windows 11. The issue seems to be with the permission on the file. Navigate to the folder C:\Windows\System32\opus.dll with the file utility (not a shell or cmd prompt) and right click on the file. Be sure the permissions include your profile, especially if you are not running as a System Administrator. The procedure and information regarding file permissions is available online. Unfortunately the debugging option does not work with the compiled Windows EXE file. Report the problem in as much detail as possible to the developer, and copy any error messages that do appear.

Notes on Operation

Audio functions on Linux can sometimes be challenging. A working knowledge of ALSA, alsamixer, and alsactl is useful. Pavucontrol can assist with selecting the correct audio input and output. Be sure to check the Configuration tab in pavucontrol, and if audio is not working, try another combinations. These may include “Stereo Duplex,” “Play HiFi quality Music,” and “Pro Audio,” among others.

In the **App** settings, **Audio Settings** will generally this will be left at “default,” but there may be circumcstances where other selections are needed. These may include “OSS” or various settings found in the sound system. Most of the audio issues appear to revolve around audio selection outside K4 Companion. In Windows, the App settings are likely to be “Microphone Array” for the “Current Input Device” and “Speakers/Headphones” for the “Current Output Device”.

If there is INVALID information in the configuration file, *settings.ini,* you might need to edit the file directly. The path to the file is *$USER/.config/k4companion/* The following lines are where you might have problems. These can be edited directly, or the incorrect information removed and entered correctly on the next startup of the program. Under Windows, the INI file is found at *$USER\AppData\Roaming\k4companion\* In the current versions this is very unlikely to be necessary.



```
[Elecraft K4]
insecure_password_hash =
address = 192.168.1.128
port = 9205
proxy_address =
```

Another note about Windows: I have noted it is prone to random audio failures, including disabling the audio for unknown reasons. You might have to dig into the subsystem a bit. I recommend using the Sound App, not the control panel. Use *mmsys.cpl* to access the Sound App. Control panel is often not very enlightening and the Sound App gives more information. As always, YMMV – your mileage may vary!

An experiment recently proved that K4 Companion will run on WSL – Windows Subsystem for Linux, but it is not easy to set up, and there are quite a few stumbling blocks. Choppy audio is probably the greatest impediment, probably due to adding extra layers of complexity to the audio subsystems. It will like run under Parallels or other emulators, but with the same audio delay issues.

Enjoy!

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This manual was produced using FOSS, Free Open Source Software

Revision History

```
    update Window/k4companion.exe 1.2.0

    Update README.md 2025-04-17

    Update opus.dll to version 1.5.2

    Fix lost sub-receiver audio with 2 panadapters
      When dual panadapter mode is selected, the K4 sends an SB3;
      response.  However the Programmer's Manual says the only valid
      responses are SB0; (sub-receiver off) and SB1; (sub-receiver
      on). We treated an SB3; response as meaning sub-receiver off. Now,
      we treat it as sub-receiver on.

    equalizers: Show active equalizer when disabled
      When the equalizers are disabled, we'll indicate the (pending)
      active equalizers in pink, after enabling, they are indicated in
      light green.

    update Documentation/K4 Companion User Manual.pdf to version 1.2.0

    updates to Documentation/K4 Companion User Manual.pdf

    add Windows/k4companion-1.2.0-installer.exe

    Add Windows/k4companion.exe 1.2.0

    Update changelog for v1.2.0


v1.2.0:
    Fix bugs in equalizer code
      There were a few. In particular, it would previously
      unconditionally set the K4's equalizer settings on startup. Now,
      we've added an Enable/Disable button. When disabled (default),
      no equalizer changes are sent to eht K4. When enabled, changes are
      still unconditionally sent at startup according to the equalizer
      settings in k4companion.

      This is a substantial rewrite of the equalizer code.

    Update To Do list

    Control app Mic Gain locally

    Add Windows/k4companion-1.1.40-installer.exe

    Update K4 Companion User's Manual.pdf to v1.1.40 (revised)

    Update Windows/k4companion.exe to 1.1.40 revised

    Update Windows/k4companion.exe to v1.1.40
      Apparently, this didn't work last time.

    Add version number to the displayed title
    Update K4 Companion User's Manual.pdf to v1.1.40

    Update Windows/k4companion.exe to v1.1.40

    Update changelog for v1.1.40


v1.1.40:
    Request that the K4 send opus-float encoded audio
      This is the default, but other software may change the format.
      If so, we reset it to the preferred format.

    Revert "Be more liberal in accepted audio encodings"
      This reverts commit 4c734154999d1606813edf87ae308609e61b61ca.

      Instead, we'll request that the K4 send us opus-encoded audio
      via the EM3; command

    Update changelog for v1.1.39


v1.1.39:
    Be more liberal in accepted audio encodings
      Accept encode_mode_opus as well as encode_mode_int16.

      Encode_mode_opus has been tested. Encode_mode_int16 has not.

    Update Documentation/K4 Companion User Manual.pdf

    Update k4companion.exe to v1.1.38

    Update changelog for v1.1.38


v1.1.38:
    Add version display to App tab

    Update To Do list
      Add mic gain control to local audio setting.

      Add version display in k4companion on the App tab.

    Update k4companion.exe to v1.1.37
      I tried to do this earlier, but failed.

    Restore WIndows/k4companion.exe
      I don't know how the deletion happened.

      Revert "Update Windows/k4companion.exe to v1.1.37"

      This reverts commit 1b3b6b02aabaeac66cf496e0088dfd72f0e2885b.

    Update Windows/k4companion.exe to v1.1.37


v1.1.37:
    Workaround for no pyaudio default audio device
      This is a problem reported by Margaret, K4ZMA, on Windows 11.


v1.1.36:
    Ensure we have a config dir on all platforms
      If the config dir doesn't exist, create it on darwin, win32,
      and Linux platforms.

    Update k4companion.exe to v1.1.35

    Remove ESSB startup bug from To Do list


v1.1.35:
    Fix ESSB togglebutton and SSB BW slider

    Update user manual to changes in v1.1.34

    Add a Windows .exe file in the Windows directory

    Update the Users Manual including Windows version

    Add Contributions/opus.dll and associated README
      This is a Windows dll file needed for running k4companion.


v1.1.34:
    Fix Exit button operation on lost connection
      There were two problems. First the directive, QUIT!, was
      missing the exclamation point.  The second was that after
      losing connectins, we correctly didn't send commands to the
      K4. Incorrectly, we also didn't act on internal directives
      like QUIT!.

      For good measure, instead of calling the quit() function, we
      instead call the root.destroy() if tkinter is running, and we
      call sys.exit() if tkinter is not running.

    Update the To Do list

    Improve Poll class implementation

    Make vfo scanning smoother
      We used to bunch up sending frequency changes every 50 mS.
      That worked well before we added audio support.  Now, we send
      them without delay for smoother audio reception.


v1.1.33:
    Handle lost connection to the K4 more gracefully
      Popup a an error message on socket send or receive error and mark
      the connection as closed.

    Create .ini file directory on Windows if needed
```

```
v1.1.32:
    Only popup not-connected warning once

    Fix bug in direct frequency entry
      The cursor would remain in the right side of the frequency spinbox
      and wouldn't permit the entry to be changed. Fixed.

    Fix diversity audio and sub off audio

    Remove Sub AGC control
      Contrary to the documentation, the K4 AGC control affects both
      main and sub receivers.

    Remove mic gain fom to do list, already done


v1.1.31:
    Show a popup for connected, but no response.
      This occurs when the password is wrong. Suggest that the user
      check the password in the App tab.

    Avoid exceptions on controls when not connected
      Some controls would generate an exception when changed while not
      connected to a radio. We now warn instead.

    Add widgets for VOX gain and anti-vox

    Update To Do List
      Add panadapter/waterfall

    Update the user manual with changes from v1.1.30


v1.1.30:
    Update to-do list

    Restart connection when password is changed

    Remove ":Port" from label for K4 address entry box
      Generally, there is no need to enter the port number, as the
      default port of 9205 is preferred. It will still be accepted
      though.

    Update nk8o_k4companion.yaml

    Call socket.send on socket.sendmsg failure


v1.1.29:
    Reconnect to server when address/port changes

    Fix exception for non-existent audio device(s)
      This exception occurred when the name of the audio device in the
      .ini file doesn't exist on the current machine.

    Add a to-do list
    Restore cat-only operation on port 9200
      Commit b6be0efd, which introduced handling audio receive packets
      in the server receive thread, broke cat-only operation. This
      commit fixes it.

    Introduce Server.cat_only variable - internal only
      Replace the various checks for port == 9200 or 9205 with checks
      for a Server.cat_only variable. No externally visible changes.

    Read up to 10 frames before deciding: no audio
      After opening the input device, read up to 10 frames of silence
      before deciding that there is no input.

    Update README

    Update README

    Add the User Manual to the Documentation directory
      Also move screenshot.png into an images sub-subdirectory.


v1.1.28:
    Fix pyaudio open code retry code
      In commit a0bcbb, I added two retries on opening the audio devices.
      Unfortunately, I even retried opening the input device when the
      previous opens succeeded. This commit should fix it.

    Add FW versions widget

    Add SOCKS5 proxy support


v1.1.27:
    Audio Mixer toggle button now displays all options
      It still only allows selecting some audio mixer combinations,
      but will correctly display other combinations if they are selected
      via the menu setting.

    Implement all audio mixer combinations

    Retry opening PyAudio a couple of times
      PyAudio sometimes fails to open. We'll retry it twice.  If this
      doesn't work, we'll try to delay a second before retrying.

    Always send Audio MX commands to the K4
      Previously, they weren't send if "Control K4 Audio Settings"
      was set to No.

    Add QSK and VOX widgets

    Limit range of af-center-pitch slider when in CW
      In CW the range is 300-2000, otherwise it's 300-3000.


v1.1.26:
    Add k4 address and port to App settings
    Change to Opus-encoded transmit audio
      Thanks to Tom Blahovici, VA2FSQ, for a hint on setting the audio
      packet version number.


v1.1.25:
    Attempt to make server startup more reliable
      There were race conditions where responses were sometimes received
      from the K4 before we were prepared to receive them.  I hope this
      commit addresses the problem.

    Update nk8o.k4companion.yaml

    Add RIT and XIT widgets

    Minor change to audio-effects toggle button

    Add Software Release Widgits

    Add "Normal" buttons for AF Center Pitch


v1.1.24:
    Reorganize widgets on receive and transmit tabs

    Add equalizer tab

    Standardize calls to server.subscribe_cmds
      Internal change only, no externally visible changes.

    Widen AF Center-Pitch settings

    Add SI parameters to the list
      Include SIDA, SIDD, SIDU, SIFP, SIRF, and SIRC. These are not
      fully documented in the Programmer's Reference Manual.

    Add CTCSS toggle and dropdown buttons

    Add noise reduction toggles and sliders


v1.1.23:
    Add noise blanker toggles and sliders

    Add auto-notch toggle buttons

    Add transmit voice monitor level slider

    Add mic gain slider

    Add center pitch sliders

    Add AGC toggle buttons

    Add audio effects toggle button

    Add CW pitch slider
    Add Receive tab with AF-Limiter and APF sliders

    nk8o_k4companion.yaml: Update to latest

    Rename the Settings tab to be App
      Since all the parameters we can configure can be considered
      settings, label the k4companion-specific settings "App".

    Add transmit tab with compression and ssb bw
      To the transmit tab, we add a compression slider, an ESSB on/off
      togglebutton, and an SSB bandwidth slider.


v1.1.22:
    Queue received audio in the receive thread
      Previously, the main thread would dequeue audio packets from the
      receive queue and then queue them on the audio queue to be picked
      up by the audio input thread. Now, the received thread places
      audio packets directly on the audio queue, reducing audio latency.

      I attempted to drop received audio packets if *any* were already
      queued.  This resulted in too many dropped packets and audible
      artifacts.

    Remove duplicate set_only suffixes
      Internal change only, no visible impact.

    Change mic attenuation to a factor of 2000000
      It was 5000000


v1.1.21:
    Add initial audio transmit capability

    Fix TX Monitor Remote Menu initial setting

    Add timer functions - useful for debugging

    Clean up socket sendmsg errors

    Clean up error handling on socket connect failure


v1.1.20:
    Queue popup msgs, making them thread-safe
      Popup messages would not display properly when called from threads
      other than the main thread.

    Move except clause after queue.get_nowait()
      Code cleanup only. No change in behaviour

    Fix the sidetone slider
      The sidetone slider  now ignores "ML;" responses not representing
      CW sidetone

    Update nk8o_k4companion.yaml
```

```
      With Charles' latest.

    Improve reliability of slider controls
      If a slider was moved rapidly, it was possible, though difficult,
      to get the slider value out of sync with the value sent to the K4.
      For example, the power slider might read 84 Watts, but the radio
      would actually be set to 79 Watts. This commit should fix that
      problem.

    bugfix: If audio input device is in settings
      This is part of the preparation for handling transmit audio


v1.1.19:
    bugfix: Fix Control K4 Audio setting

    Fix the Transmit/Receive togglebutton
      Before, it would work when clicked, but did not track the K4's
      state properly when the XMIT button on the K4 was pressed.


v1.1.18:
    Fix audio on system without 12000 Hz sample rate
      I obviously insufficiently tested commit e43a09ae "Resample to
      least multiple of K4 sample rate"


v1.1.17:
    Resample to least multiple of K4 sample rate
      Instead of resampling only to 48000 Hz, resample to the least
      integer multiple of the K4's sample rate. I.e, the first supported
      rate of: 12000, 24000, 36000 or 48000 Hz. This will save CPU time
      on devices that support one of the lower output sampling rates.

    Integrate "directives" into the cmd structure
      Previously, buttons could have an option, "directive", indicating
      actions to be performed by the application. Now, directives are
      commands whose name ends in '!'. Examples:
        "directive: connect" becomes "cmd: CONNECT!;" "directive: quit"
        becomes "cmd: QUIT!;" "directive: show_previous_page" becomes
        "cmd: SHOW!PREVIOUS;" "directive: show_page XXX" becomes "cmd:
        SHOW!XXX;"

    Require debug_level >= 2 to print sent/received msgs
      Then uncommon debug messages won't become lost in a sea of common
      debug messages.

    No longer specifically request menu definitions
      Now that we get a dump of all K4 parameters at startup, we no
      longer need to later request the menu definitions.

    Add 5 Khz receive bandwidth option to config file


v1.1.16:
    Fix initial state of the Test Mode togglebutton
      We do this by delaying sending the RDY; command requesting the
      state of the transceiver until after we have sent our startup
      commands.

    Always control K4's audio on port 9200
      When receiving audio, we may not want to control the actual radio's
      audio, but when not receiving audio in the app, we always want
      to control the radio's audio.

    Fix debug msgs "sent: ..." on port 9200

    No longer request state for specific parameters
      Because we now get a complete dump of the K4 state, we no longer
      need to request the state of each parameter we're interested in.


v1.1.15:
    Finish startup audio settings
      Commit 409ffac was incomplete. This commit attempts to finish
      the job and also keeps the audio subsystem notified of changes
      to the diversity setting.


v1.1.14:
    Fix broken setting of audio_output_device
      Commit [b2c91fb4 Control PC audio mix and volumes] broke the
      ability to set the audio output device. This commit fixes it again.


v1.1.13:
    Fix connections on port 9200 (unauthenticated)
      Commit aaf589ad7a02322bdd9249cb549fb1942258147a broke connecting
      on port 9200. This commit fixes again.

    Fix startup issue with 'blank interface"
      Commit aaf589ad7a02322bdd9249cb549fb1942258147a didn't fix the
      problem it was intended to address. After sending the password
      to the K4, we need to wait a bit before sending the first
      command. This commit has us wait until the K4 has sent some data
      before we send the first command.


v1.1.12:
    Resample to 48000 Hz by repeating samples
      We have seen artifacts (clicks or ringing) when receiving CW
      with a couple of resamplers. Let's try a simple resampling by
      just repeating samples. The K4 provides 12000 Hz samples. Repeat
      them 4 times to yield a sample rate of 48000 Hz.

      We can only hope that (almost) all sound device support 48000 Hz.


v1.1.11:
    Delay initial dump of K4 parameters until ready
      We had a race condition where sometime the initial dump of
      K4 parameters was received before our widgets had subscribed
      to them. This caused the vfo widgets to sometimes not be
      initialized. We now delay telling the K4 that we're ready for
      the dump until we're actually ready.

      I hope this fixes the issue we were seeing.

    Fix the audio mx togglebutton cmds

    Control PC audio mix and volumes
      Also add a new setting to optionally control the K4's audio
      settings as well.

    Update README.md to mention audio receive


v1.1.10:
    Optionally, save K4 password in settings

    Enable turning on diversity
      Diversity is particularly useful since we currently hear audio
      from both receivers all the time. Diversity keeps both receivers
      in sync.

    Fix the connect togglebutton
      It used to say 'connected' even on connection failure.  Now it says
      'connecting' until the K4 actually responds.

    Add an autospot button

    Don't print PING/PONG cmds unless debug >= 3

    Disable automatically, repeatedly, sent reports


v1.1.9:
    Handle pyaudio errors during playback

    Add saving/loading of settings file

    Avoid trying to send commands until server connect

    Add Setting tab including audio device settings

    Drop audio packets if we're behind processing them

    Use pydub to resample to 44100 Hz

    Move audio processing to a its own class

    Reduce audio delay by reducing audio write size

    Set frame rate to 48000 by duplicating samples

    Raise volume by multiplying pcm audio by 20

    Resample audio to 44100 Hz using resampy

    First working audio at 12kHz sample rate
```

```
v1.1.8:
    combobox: Allow settting colors for comboboxes
      Previously, the same color was applied to all comboboxes.  Now the
      colors are applied to individual combobox instances.

    Decrease vfo spinner repeat rate


v1.1.7:
    Fix but in text widget


v1.1.6:
    Document some additional options in the yaml file
      Document is too strong of a word. A brief description is more
      accurate.  Add the fact that widgets now support the leading
      option for additional vertical space before the widget and a
      label to surround the widget with a labeled frame.

    Move power-off and Exit buttons to column 2

    Improve password popup
      It's now a modal window, forced to remain on top.


v1.1.5:
    Add authenticated connection support on port 9205
      If the K4's port is specified as 9205, a password-protected
      connection is made on that port. This is a step toward supporting
      audio and PAN data on this connection.


v1.1.4:
    k4companion.yaml: Simplify yaml
      No externally visible changes in behavior.

    Remove groups that wrapped widgets for a label
      We instead put the label as an option of the widget.

    Add suport for labels & leading to all widgets
      This avoids the need to wrap the widget in a group just for a
      label and/or leading.

    Simplify font inheritance
      No outwardly visible changes except for a minor speedup.

    Permit a label to be added to widget items

    k4companion.yaml: Clean up the config file

    Improve validation of required item options

    Allow dash characters '-' in yaml file definitions

    Fix initial state of xvtr band selection settings
    Add a current screenshot to the README


v1.1.3:
    Rename program to K4-Companion
      This program has grown far beyond its initial ability to send
      macros to the K4. The name change better reflects its capabilities.

    Code cleanup

    k4macro.yaml: Move power slider
      This puts the audio sliders above the audio mixer selector.


v1.1.2:
    bugfix: Restore display of group labels
      Commit ceee3ba6a, which added tabs to pages, stopped displaying
      labels on groups. This commit restores them.


v1.1.1:
    menu: Defer loading menu definitions until needed
      We now don't request menu definitions from the K4 until the menu
      is to be first displayed.


v1.1.0:
    Version 1.1.0

    Add K4 menu support
      It may not be pretty but it appears functional

    Add tab support to pages
      Avoid requiring a notebook item being added to pages in oerder
      to get tabs.

    nk8o_k4macro.yaml: Add power_dropdown widget

    connect_button: Detect when k4 is connected

    nk8o_k4macro.yaml: Update from Charles, NK8O

    config: fix power_dropdown widget

    toggle_button: Allow some selections to have a cmd
      Previously, if one selection specified a cmd, all selections were
      requried to specify a cmd. Now only some of the selections may
      specify a cmd.

    Dropdown: Fix font setting


v1.0.43:
    Fix the range of the main and sub volume sliders
      The K4 maintains volume in a range of 0-60. In a misguided attempt
      to go from 0-100%, I scaled that to 0-100. Unfortunately, that
      does not map well. We now show the actual volume range of 0 to
      60 for the volume sliders.

    bugfix: Avoid recursion on power slider
      The recursion was introduced when we permitted responses from the
      K4 that match current values to be forwarded to subscribers. That
      change was necessary.

    Simplify K4 error code handling


v1.0.42:
    Validate item options in config file
      Check for required as well as optional options.


v1.0.41:
    Reformat K4 error messages


v1.0.40:
    Move power, ALC, SWR and CMP bar graphs up

    Show error messages for codes received from the K4
      We display them in a pop-up window.

    Permit connecting to the K4 via a button

    Rename cyclebutton to togglebutton
      Remove cyclebutton altogether as well as the updown option.


v1.0.39:
    Avoid subscribing to set-only commands
      Since they will never respond, there is no value is subscribing
      to responses for them.


v1.0.38:
    Fix incrementing/decrementing frequency
      It was failing when the existing frequency was not a multiple of
      the step size.


v1.0.37:
    k4macro.yaml: Fix SWR bar graph

    Remove atu_trainer_kx4ui.yaml, ctrl_panel_kx4ui.yaml
      They have some good info and may be resurrected later, but for
      now we're not keeping them up-to-date.


v1.0.36:
    Fix and recalibrate bar graphs

    Add ATU extended tune
```

```
v1.0.35:
    Rename all evaled options
      For example:
        responsevalue is now evalresponse cmdvalue is now evalcmd

    Many changes (Sorry)
      This change add bargraphs for power out, ALC, SWR and compression.
      Bargraph labels now use a fixed-width font by default.  By default
      1-point of leading is displayed before groups with labels.
      k4macro.yaml: It also rearranges several displayed widgets
      Miscellaneous bug fixes

    k4_macro.yaml: Add group marker comments
      Add #{ and #} markers at the beginning and end of each group.
      These help me find the end of a large group.


v1.0.34:
    Display active VFO and transmitting VFO
      Color the VFO frequency (currently pink) of the active VFO. While
      transmitting, color the VFO with the transmit freu=quency
      (currently red).

    Clean-up the display a bit


v1.0.33:
    radiobutton: fix bug referencing text

    nk8bo_k4macro.yaml: Add missing attenuator values


v1.0.32:
    k4macro.yaml: Add goodies from NK8O

    nk8o_k4macro.yaml: Include latest changes from NK8O

    Fix unexpected bandwidth and attenuator values

    Permit set_only and get_only cmds if multiple cmds
      For radio, dropdown, and cycle buttons, if a set_only or get_only
      command is specified, it it now permitted as long as it is not
      the only command or response.

    k4macro.yaml: Spelling change: Atten -> Attenuation


v1.0.31:
    Add nk8o_k4macro.yaml
      Example config file from Charles, NK8O.

    k4macro.yaml: Various updates

    config: Make togglebutton a synonym for cyclebutton

    cyclebutton: Set wraparound default to true
    Move cyclebutton 'justify' from selections
      Move 'justify'; option from selcections to cyclebutton

    Enable the width of the VFO to be specified

    Auto-set S-meter bar graph length
      Set the S-meter bar graph according to a percentage of the
      length of the text below the bar graph. The S-meter bar graph
      will match the text regardless of the point size of the text or
      the screen resolution.

    Add check for group without "contains:" in yaml


v1.0.30:
    Use dropdown buttons to replace cycle buttons

    Add dropdown buttons via a combobox


v1.0.29:
    Catch exceptions when calling eval
      If an exception occurs during an eval, print additional
      information.

    Change vfo INDY button text to UNLINKED


v1.0.28:
    Make VFO frequency display larger

    Calculate cycle selection width based on siblings
      Set cycle button selection widths on the maximum width of all
      siblings within the cycle buttons group.

    Use config preprocessor to organize YAML

    Simplify config file with a preprocessor
      Implement a simple preprocessor to simplify the organization of
      the YAML config file.

    Fix range of the sidetone slider
      The K4 Programmer's Manual says the range should be 0-100 in K4
      mode, and only 0-60 in K3 mode. But it appears to be 0-60 in K4
      made as well.

    Remove blinking from Tx Test on button
      Make it red instead.

    Change flashrate option to 'blink'

    Make all widgets black on white
      We can add color back in sparingly as needed.

    Reduce VFO step width to 6 characters
      Now that we don't offer a step width of 100 KHz, we no longer need
      a width of 7 characters to accomodate it. Six characters suffices.
    Remove auto-wrapping button text
      Auto-wrapping button text messed up multi-line button text,
      so this commit removes it.

    When debugging, avoid printing auto received msgs
      Certain messages are automatically received continuously from
      the K4.  Currently that includes the S-Meter messages. Now,
      we'll only print those if the debug level is 3 or higher. This
      permits us to more easily monitor the other send/receive messages.

    Rename options that are eval()ed
      If they are passed to eval() rename the optios. This includes:
        cmd -> cmdvalue response -> responsevalue increment ->
        incrementvalue

    k4macro.yaml: Make some text changes
      Thanks to Charles, NK8O.


v1.0.27:
    Verxion v1.0.27

    Latest yaml changes using more cycle buttons

    Add support for Notebook (tabs)

    Add a bargraph, with S-Meter example

    Add a getvalue widget
      The getvalue widget is used to report a value that is automatically
      updated by the K4. For example, an S-Meter reading.

    Apparently, the K4 can return a null mode
      Some have reported receiving a response of MD; to a command MD;
      instead of MDn; as documented. It appears that the VT command can
      be sent with a null mode, rather than the documented required mode,
      so we'll just go with it.

    Oops, fix partial cmd at the end of a read buffer
      Fix silly error in commit c77bfb8e4bfe6331c8ce8e71ab27afa3cf553462


v1.0.26:
    Handle a partial cmd at the end of a read buffer
      When a buffer is received that does not end in ';', a partial
      command is at the end of the buffer, and must be prepended to
      the following buffer that is received. The logic handling this
      was wrong. I hope it is correct now.

      Thanks to Dick, N4UN, for reporting the bug.

    Make a few more buttons into toggle buttons
      Thanks to Charles, NK8O.

    Make ATU bypass/auto buttons into a toggle button
    Add ability to cycle cyclebuttons up and down
      They cycle up if the button is clicked in its upper half and they
      cycle down if the button is clicked in its lower half.

    Change cyclebutton wrap to wraparound
      It now matches the (brief) documentation.


v1.0.25:
    Implement the cyclebutton widget
      This is a button that cycles between several button
      selections. Each selection can have its own command and text or
      image. As a special case, when there are two selection it is a
      toggle button that alternates between the two states.

    Change K4 error return to a warning unless debug
      Unless debugging is turned on, if the K4 returns an error response,
      we'll just print a warning message. If debugging, it will continue
      to produce an exception. We haven't seen any of these errors,
      I just want to be able to note them if/when they occur.


v1.0.24:
    Make vfo step combox box read-only
      This prevents the user from inputting invalid values.

    Fix checking for an error response from the K4
      We now will accep responses consisting of the command base.

    Fix sidetone slider


v1.0.23:
    Workaround a K4 bug dealing with 100 KHz vfo steps
      At least on the current version Production V36 and Beta V37.1,
      On startup, regardless of the VFO A step size, it reports a step
      size for VFO A of 100 KHz. The step size for VFO B is reported
      correctly.

      Also, if you try to select 100 KHz steps, it shows 100 Hz steps
      but reports via the API that it has 100 KHz steps.

      We disallow seting 100 KHz step size via the API and if we receive
      a step size of 100 KHz, we force it to be 100 Hz, matching what
      is on the K4 display.

    Request the K4 to send updates immediately
      Previously, updates were sent every 60 mS.

    Remove a harmless exception
      The condition triggering it is harmless and probably caused by
      a difficult-to-avoid race condition.

    Bugfix: Handling receiving vfo step size was broken

    Change sidetone level to a slider
    Only store response after base in k4_parameters
      Instead of storing the cmd/response base, we just store the portion
      of the command/respnse after the base characters. For example,
      for the response "MD1", where we used to store the entire response,
      we now just store "1".

    Add list of all command bases
      For future possible use.

    Check for error response from K4
      Raise an exception if the K4 responds that a bad command was sent.

    k4macro.yaml: Organize into two columns
      This removes the need to specify as many row and column placements.

    Change volume control to be a slider

    k4macro.yaml: Fix 5% volume value

    Cache get-only commands as well as normal cmds

    Make k4macro.yaml display more vertically compact

    Add back the yaml comments re the vfo settings


v1.0.22:
    Add latest mods to NK8O's k4macro.yaml file

    Bugfix: Set vfo step size properly on startup


v1.0.21:
    Change vfo step selector to a combobox
      The vfo selector defaults to combobox, a spinbox can be selected
      by adding 'step_spinbox: true' to the vfo yaml entry.

    New k4macro.yaml changes form NK8O

    Improve vfo direct frequency entry method

    Oops, the previous commit was too lenient, IMHO
      Raise an exception when trying to add a duplicate poll request.

    Make poll add/remove functions more tolerent

    Add button flashing capability to radio buttons


v1.0.20:
    Version 1.0.20

    Speed up displaying of multiple pages

    vfo fixes

    Handle commands with special "get format"
```

```
v1.0.19:
    Version 1.0.19

    Fix multiple page support
      Now the directives 'show_page' and 'show_previous_page' now work,
      although page display is not fast.

    Remove unused variables

    Synchronize VFO step size with K4

    Maintain state only for stateful commands
      Do not maintain the K4 parameter state for non-parameter commands.
      These are the commends that are set-only or get-only. Also,
      disallow set-only and get-only commands in radio buttons, because
      radio buttons need to match the K4 state.


v1.0.18:
    Unconditionally send commands
      We were being smart and assumed that all commands set K4 state.
      This is true for most commands, but not all. In particular, the SW
      commands modify the K4 state, but they don't directly represent
      state.  Now, we'll send commands even if we recently sent the
      same command.  In the future, we could distinguish between those
      commands that represent state and those that don't, but it likely
      isnt worth it.


v1.0.17:
    Version 1.0.17

    Update example_config_files/k4macro.yaml
      Incorporate the latest changes from NK8O.

    Always request parameter status when subscribing
      When subscribing to a K4 parameter, unconditionally request the
      parameter's current status.

    Rework polling mechanism
      Add capability of having poll callbacks with differing intervals.
      Right now we send vfo updates after 50 mS from the last change
      and poll receiving from the K4 every 1 mS.

    Remove server.base_cache
      It is an unnecessary kludge


v1.0.16:
    Version 1.0.16

    Internally maintain the K4's parameter status
      This simplifies the handling of radio buttons that send  multiple
      commands and responses, pemitting some radio button bug fixes.
```

```
v1.0.15:
    Version 1.0.15

    Implement a slider widget
      An example using it to set/get the K4 power output has been added
      to example_config_files/k4macro.yaml

    k4macro.yaml: incorporate changes from NK8O

    Fix debug msg on received bytes vs string

    Print debug messages to stderr

    Do not decode responses from non-K4 servers

    Add two config files created by KX4UI

    Clarify a message when the K4 has disconnected


v1.0.14:
    Version 1.0.14

    Gracefully handle server (k4) shutdown


v1.0.13:
    Version 1.0.13

    Rework radio button response handling
      Now gracefully handles radio buttons that do not include all
      possible values for the particular parameters controlled by the
      radio buttons.

    Rename k4macro.yaml.nk8o to k4macro.yaml
      Keep k4macro.yaml.nk8o as the only current example config file
      and rename it k4macro.yaml.

    Simplify specifying server startup commands
      This simplifies the implementation as well as the specification
      of startup commands.

    Remove no longer needed comments from config

    README: Add request for problem reports


v1.0.12:
    Version 1.0.12

    Add ability to send commands to K4 at startup

    Cleanup the code a bit

    Bugfix: Button cmd sending was broken, now fixed
```

```
v1.0.11:
    Fix version


v1.0.10:
    Permit different radiobutton response than command
      Previously, the radiobutton code expected a response identical
      to the command being sent. This is not true if we send multiple
      commands on a radiobutton click. Add the capability of specifying
      the desired response to the radiobutton click.

    NK8O's latest yaml

    Permit multiple callbacks on same radio response


v1.0.9:
    Fix bug in row calculation for widget placement
      The row was not being advanced properly, causing widgets to be
      placed on top of previously placed widgets.


v1.0.8:
    Add Radiobutton widget
      Make band and mode selector radio buttons


v1.0.7:
    Globally rename variable name info to config_info
      config_info is a bit more meaningful than info.

    Raise default button font size to 10
      This makes the smaller controls easier to see and to click.
      We leave the default label size at 8 as they don't need to be as
      prominent as the controls, IMHO.

    Close the program if a server is not found


v1.0.6:
    Get updates from K4 every 60 mS
      Previously, the K4 would send updates immediately, but k4macro
      could not keep up when the vfo knobs were spun rapidly.

      While we're updating, clean up an oops in the yaml file.


v1.0.5:
    Add infrastructure to receive status from the k4
      Initially, this is used to update the vfo widgets when the k4
      vfo knobs are changed.

    Fix bug to handle text that is an integer
      Text in the yaml file that happened to be an integer was being
      treated as an int rather than a string. Force it to be a string
      by using the str() function.
```

```
v1.0.4:
    Fix version number to match tag


v1.0.3:
    Add initial support for setting VFO frequencies

    Remove debug msgs for delay between servers

    Add email address to README


v1.0.2:
    Add ability to delay between cmds sent to servers
      We can now specify a delay between commands sent to servers
      by inserting a pseudo server name of delay and a numeric value
      in millseconds.

      For example: [ k4: xxx, delay: 100, server2: yyy ] will delay 1/10
      of a second between sending the commands to servers k4 and server2.

    Specify multiple cmds to servers via a list
      There was a problem when specifing multiple commands to multiple
      servers via a dict. Repeated commands to the same server would
      replace previous commands to that server in the dict. We now
      specify a list of dicts to alleviate that problem.


v1.0.1:
    Specify different fonts for labels and buttons

    Version 1.0.0
      First release to github

    Initial commit
```