



**MixW4-1.4.2 Release 3117      11-January-2022**

**Created on 08-February-2022**

## **Introduction**

**MixW4 is designed to run on Windows 7 and later operating systems only.**

MixW4 has a 15-day evaluation period, so you may try it before you buy it. The unregistered version is fully functional, it only shows the UNREGISTERED window to the user. You may check your registration status [here](#). MixW stands for a Mixture of different modes.

In 1992 Nick Fedoseev (UT2UZ) wrote an MSDos program for RTTY. In 1998 he then wrote a multimode program MixWin the last version being MixW1.45. Denis Nechitailov (UR8US) joined Nick to produce MixW2 in 2002. This incorporated the panoramic spectral display developed by Skip Teller (KH6TY) used in DigiPan. MixW3 was introduced in 2011 and MixW3.2.105 is the latest version.

In 2016 Rig Expert Ukraine took over support and development of MixW. Denis is their CEO and Nick acts as a consultant.

MixW4 is the latest development. It will be a cross platform version of MixW intended to run under Windows, Linux and Mac operating systems.

**Before using MixW4 for the first time read through the *Getting Started, Configuration and Operation* sections of this Help file.**

## **Getting Started**

### **Recommended System Requirements**

1. 2 GHz processor
2. 2 GB of RAM
3. 500 MB available hard disk space
4. Screen resolution from 1920 x 1200
5. Windows 7, Windows 8, Windows 10 or Windows 11

### **MixW4 Installation.**

A MixW4 release is delivered as a single self extracting installation program file.

Before installing MixW4 you must choose which disc layout you want to use.

There are 2 choices

1. Use the default settings. **If you choose this layout you must remember the default settings displayed in the two choice screens.**
2. Choose the names and locations of the folders you are going to use for program and data files.

**Do not use the same folder to install both program and data files. During testing this has been found to create problems.**

### **Installation Program Download.**

MixW4-1.4 is built in 32 bit and 64 bit versions.

Download the latest MixW4 installation file suitable for your PC from:

<https://rigexpert.com/products/software/mixw-4/downloads>

Download version 1.4.2 x64 - 64 bit version.

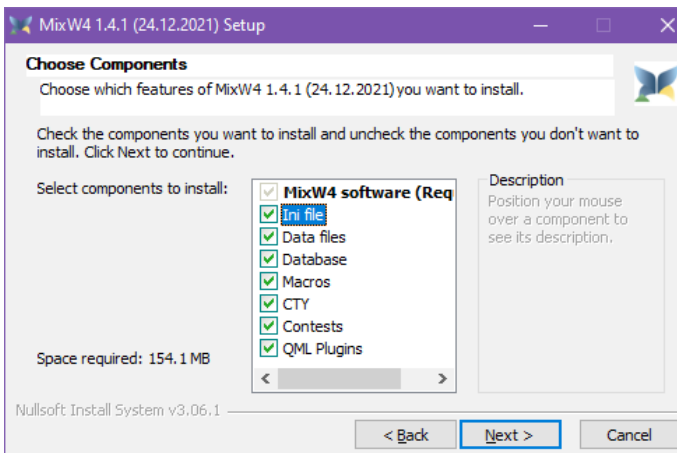
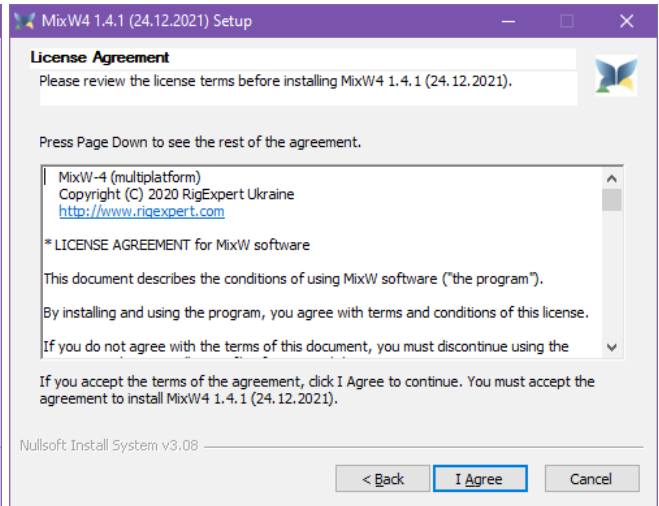
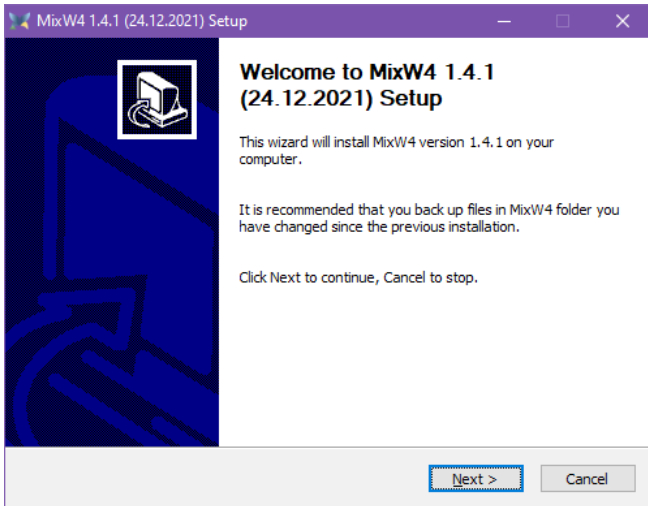
Download version 1.4.2 x86 - 32 bit version.

At the same time, if you have recently purchased MixW4 you can check your [registration](#) has been accepted. Your installation will not be actively registered until you have paid for the software and submitted your callsign. Previous versions of MixW (MixW2/MixW3) required the file to be unblocked before installation for all functions to be available.

I have found MixW4 can be installed and work without unblocking the installation file but [unblocking](#) this file does no harm.

# First time installation.

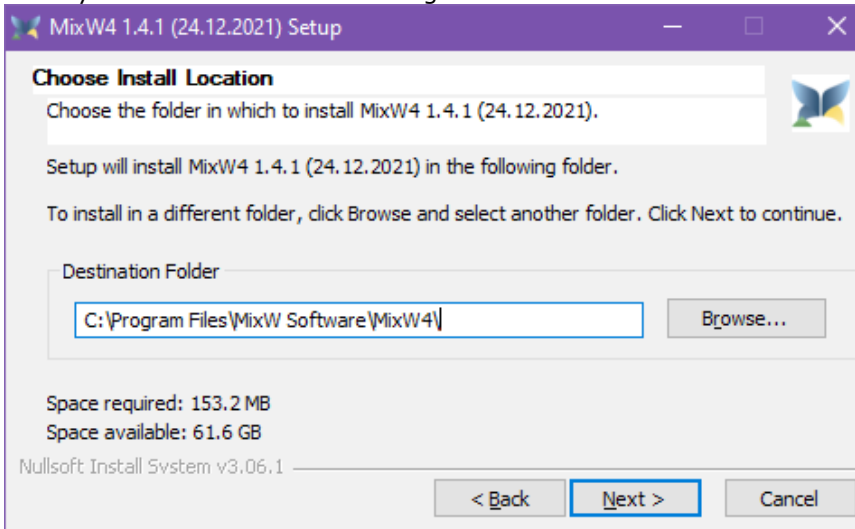
Run the downloaded file.



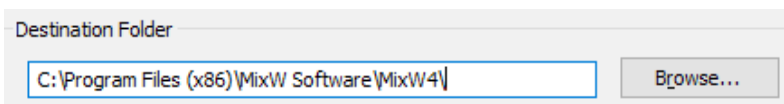
As there is no MixW4 installation on this PC all items should be ticked.

See the [Installation folders](#) section for where the items are installed.

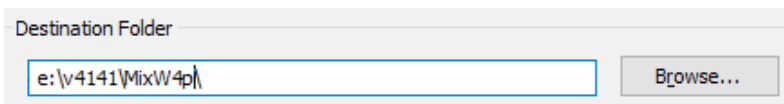
Make your choice of where the Program Files are to be installed.



This Installation Program Folder is for a 64-bit default installation. 1 in the layout choices above.

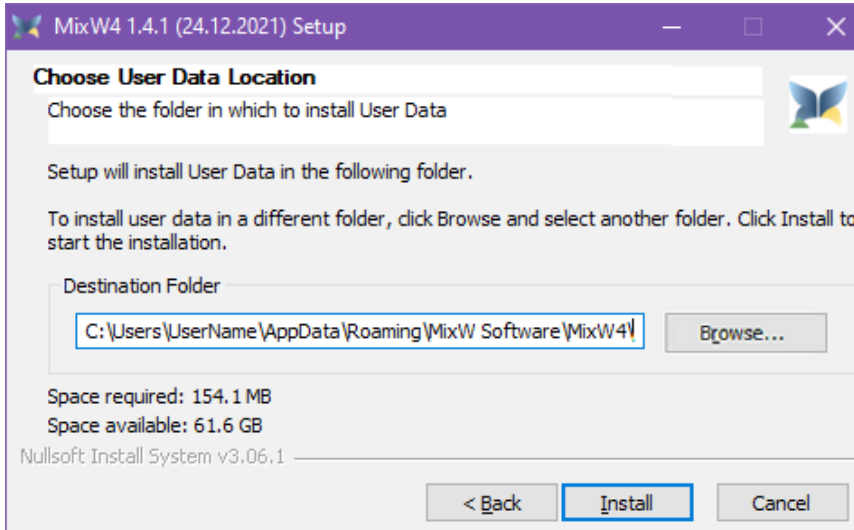


This is the Installation Program Folder for a 32-bit default installation.



This is my Installation Program Folder choice using option 2 above.

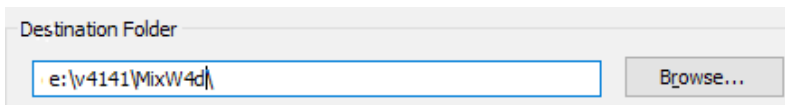
Choose the folder to contain the User Data installation.



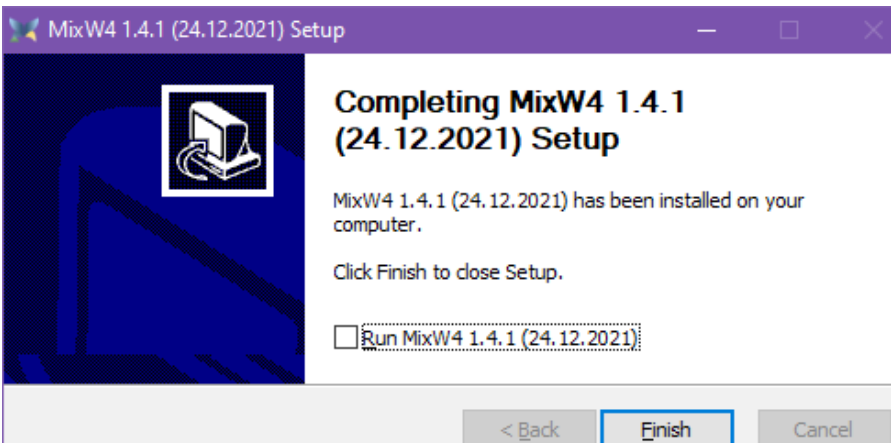
This is the default User Data installation folder.  
1 in the choice above.

Both 32-bit and 64-bit installations use the same folder.

*UserName* is your log in username.



This is my User Data installation folder choice using option 2 above.



This completes the installation of MixW4.

## Upgrade installation.

**Before starting a replacement installation make sure you have saved any files that have been changed since the last installation.**

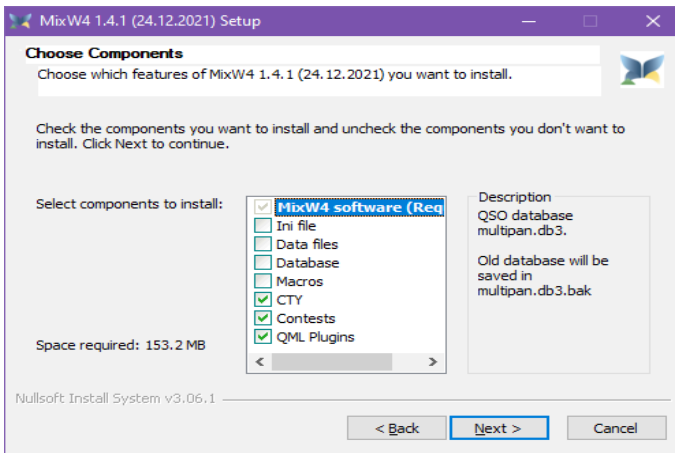
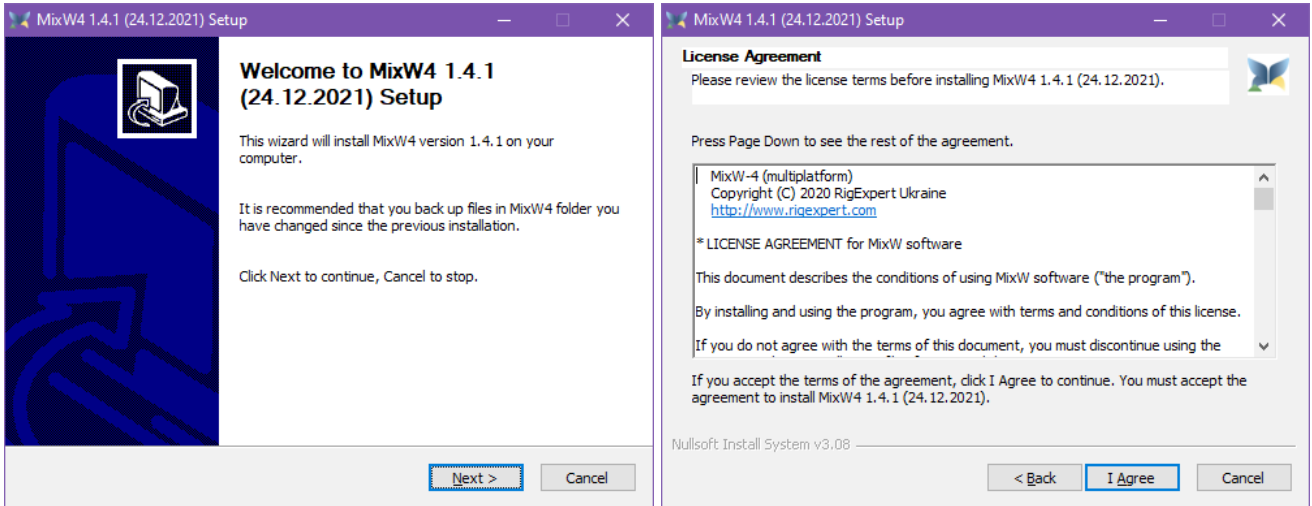
**If you are satisfied with the old installation layout save this layout using the Save/Load/Restore layout option and restore it once the new MixW4 installation is working correctly.**

There are 4 different upgrade methods:

1. Use the new MixW4 release to overwrite the current installation.  
Follow the Upgrade installation steps below.
2. Create new installation folders without uninstalling MixW4.  
For this method follow the [First time installation](#) steps.
3. [Uninstall Mixw4](#) and reinstall the new version using the same data folder name.  
Follow the Upgrade installation steps below.
4. [Uninstall MixW4](#) and install MixW4 as if it is a first time installation.  
For this method follow the [First time installation](#) steps.

## Upgrade installation steps

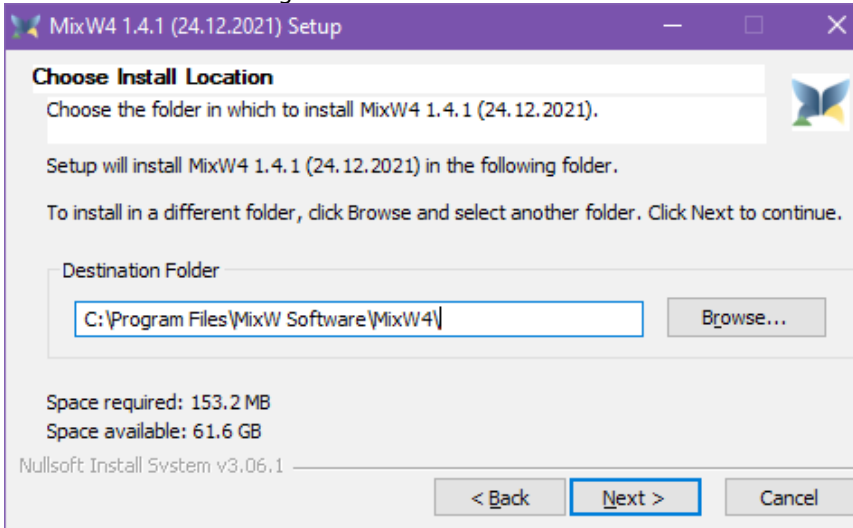
Run the downloaded file.



The installation program will select the minimum items required to complete the upgrade.

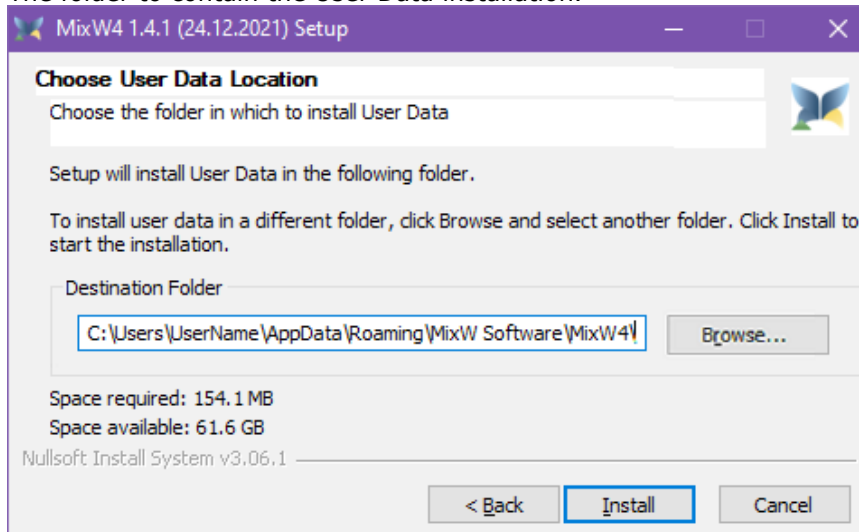
See the [Installation folders](#) section for where the items are installed.

The location of the Program Files.



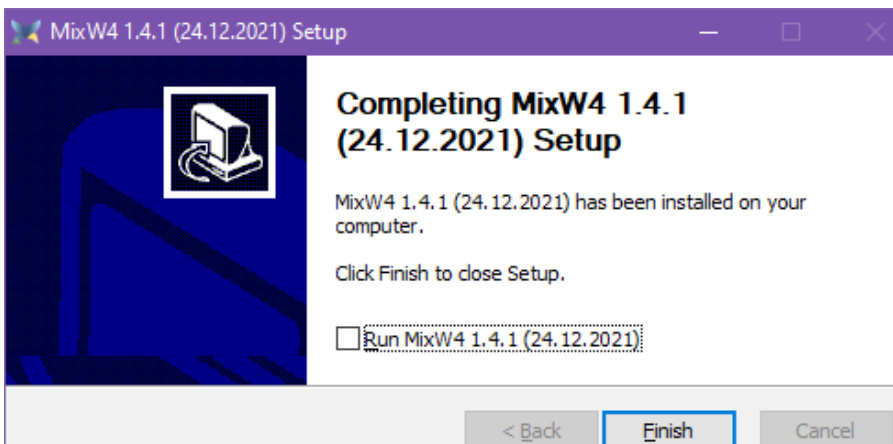
This should be the same folder as used in the previous release.

The folder to contain the User Data installation.



This must be the same folder as used for the previous release.

If the installation program detects it is copying a duplicate filename it appends the original file name with *.bak* before copying the new file.



This completes the installation of MixW4.

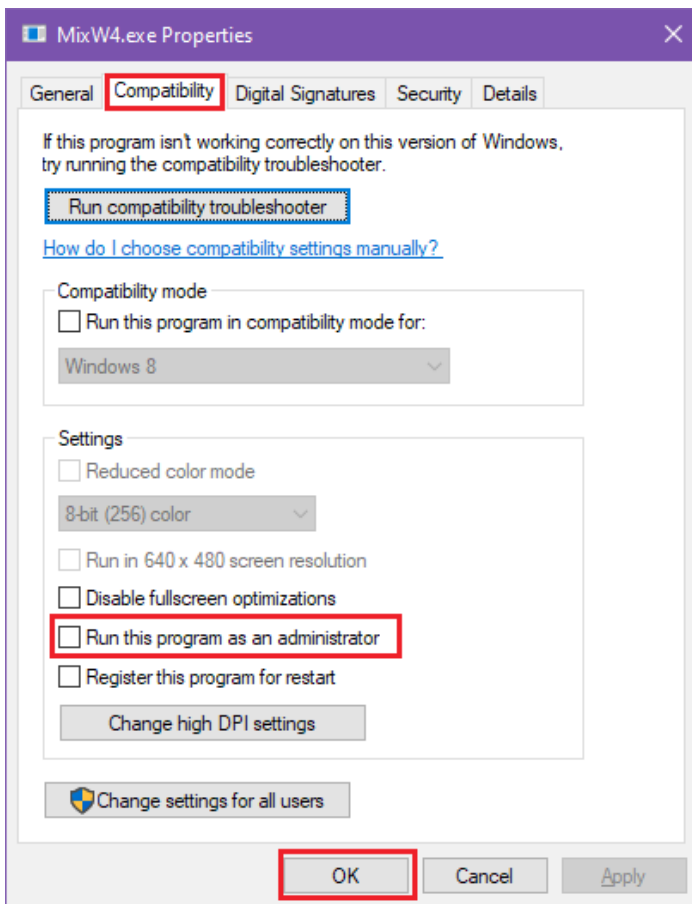
### Setting MixW4 to always start as Administrator.

This step may not be necessary for MixW4.

Some users found they had problems updating or creating files in previous releases (MixW2/MixW3).

I have included this in case this proves to be a problem with MixW4.

Open Windows/File Explorer and navigate to *{Program\_file\_root}\MixW4.exe*. Right click on MixW4.exe and select Properties.



Click on the Compatibility tab.

Tick *Run this program as an administrator*.

Click OK.

## MixW4 Installation Folders and Files

Although at installation time there were 2 possible methods both result in the same Folder structure on disc.

### Program Files Folder structure.

The contents of this folder and sub-folders are generated before the MixW4 installation file is built. Only MixW4.exe or uninstd.exe may need to be addressed.

None of the Program files should be changed.

#### Folders Contents

##### {Program\_files\_root}

audio

bearer

CatDLLs The control file for each supported transceiver manufacturer.

iconengines

plugins Has sub-folders. Contains mode .DLL files.

qmltooling

Qt Has sub-folders.

QtGraphicalEffects Has sub-folders.

QtQml Has sub-folders.

QtQuick Has sub-folders.

QtQuick.2

QtTest

QtWinExtras

sqldrivers

### Data Files Folder structure.

#### Folders Usage

##### {Data\_root}

AudioLog	For saved audio files. Created after MixW4 has been started for the first time.
Contests	Contest information files, Contest control files, Contest macro files and Cabrillo files.
CWT	Morse character set files. Minimum contents must be ENG.cwt.
Data	Storage for cty.dat, pfx.dat, calls.dat and schedule.txt. Also contains dxccEntity.json used for internal program cross referencing. Do not change this file.
ecards	For storing eQSL card images fetched from eQSL.cc.
Macros	Macro storage. Macro files have .json extensions..
MixPlugins	Installed MixPlugins. Each plugin has a separate folder.
RxLog	Storage for RX logs. This folder is not created until the <i>Log RxView content to file</i> control in the Settings menu is checked.
translations	No information available as to what its use will be. This folder is not created until MixW4 is started for the first time.

**If a file is in one of the program structure folders LEAVE IT ALONE**

## Transceiver to PC Interface

Interfacing your transceiver and PC to work with MixW can be handled many ways. The minimum is an audio path between the transceiver and computer sound card.

To make full use of the MixW4 transceiver controls a suitable interface, either USB or COM port, is required. You can configure your system to switch between TX and RX in four ways.

1. MixW is configured to operate a push-to-talk (PTT) switch via a voltage to the DTR or RTS pins of a com port, the same port can also be used for serial communication with the radio (CAT operation) if desired.
2. MixW is configured to send transmit and receive commands to the radio via CAT control, without using the PTT circuit (your radio must support PTT by CAT command).
3. Use the VOX circuit in your transceiver to switch it into transmit when it hears the audio sent by the computer, and back to receive when the audio stops. MixW only has control over the data transmission. CAT control is not needed for this method.
4. Operate the radio transmit/receive manually. MixW has no control over this operation. CAT control is not needed for this method

Note:

1. A number of modern transceivers have a built in USB port to allow both CAT and audio signals to be exchanged with a PC USB port.
2. There are a number of commercially constructed interfaces available to enable CAT control and PTT operation of most modern transceivers. A number of these interfaces also contain separate built in sound cards.
3. Also available are units that allow COM ports to be derived from PC USB ports.
4. A number of circuit diagrams are available on the internet to allow personal construction of an interface.

**Important Note:** Your microphone must be disconnected from the radio (or otherwise switched out of the circuit) to avoid inadvertently transmitting voice signals in the digital bands. When using VOX, Non-MixW computer sounds (such as the Windows start up chime) can also trigger the VOX circuit and key the transceiver.

There are up to 5 different settings that can affect the operation of the transceiver from MixW4:

1. Windows - Audio, COM Ports settings.
2. MixW4 - Audio, CAT, Macros, COM Ports settings, Mode settings.
3. Control interface - this is for non USB<>USB connected transceivers.  
Audio (maybe), COM Ports settings, Control lines.
4. Audio - this is for non USB<>USB connected transceivers.  
Audio maybe included in your Control interface.
5. Transceiver - Audio, COM Ports settings, Control lines and Menu settings.

For your MixW4 - transceiver connection to work correctly all required parts have to be configured correctly.

A problem identified using MixW2 and MixW3 with a long USB cable was low voltage at Control interface units relying on power from the USB port.

The solution was to break the USB connection into two cables and use a powered USB hub between the cables. Whilst attempting to configure the interface you have installed you may need to use Windows Device Manager to verify COM ports or Audio ports.

To activate Device Manager execute `C:\Windows\System32\devmgmt.msc`. I have created a desktop icon but you could also use `{Windows Key}+R` or use a Command prompt by running `cmd.exe` to execute the command to start Device Manager.

**Whilst configuring the transceiver to CAT interface ensure you have your transceiver manual, any documentation associated with your CAT interface hardware and the CAT settings of this manual available.**

**The required settings have to all be correctly set.**

## Starting MixW4

This section covers the initial start of a Mixw session in windows.

### Command line parameters:

-log Create a debug log in the *{data\_root}* folder.

There are a number of ways to start Mixw4:

Clicking on a Mixw Icon (shortcut) on the desktop (this is likely to be the most popular method).

Starting Mixw via a batch file.

Using the Start Menu Run facility.

Typing a Mixw command line in a Cmd window.

Using Windows/File Explorer to select the executable and click on it.

- No parameter can be used with this start method

MixW4 will start using the information in the file MixW4.ini, the multipan.db3 database and the Windows registry.

**WARNING: If you attempt to modify the registry and make a mistake Windows may become unusable.**

Apart from using the Windows/File Explorer method a command line will have to be set up.

This has the form;

*{Path to Mixw executable}\mixw4.exe optional parameters*

If you use the Start Menu Run facility or start Mixw using an Cmd window the command line has to be entered each time.

For a batch file, an edit of the file is needed to find the Mixw start line.

To find the command line in a desktop icon right click on the icon and select properties. In the Properties window select the Shortcut tab and on the line Target: is a text line with the mixw startup command line.

## First Start

The first time MixW is started after installation a number of steps may need to be taken before MixW4 is usable.

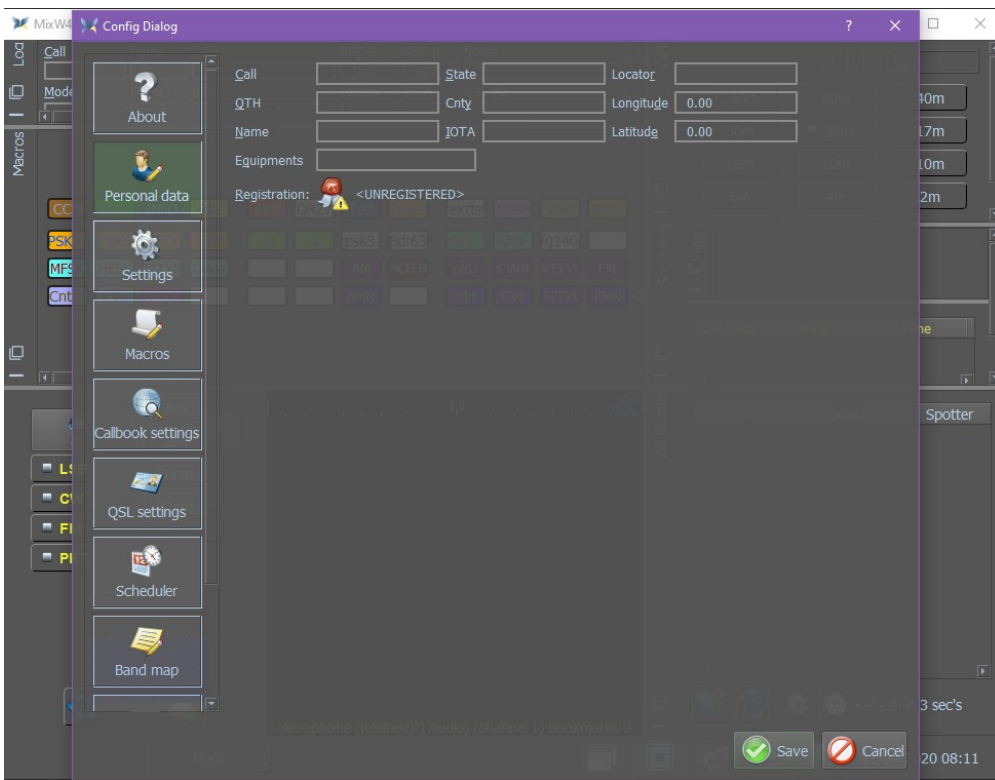
1. Your callsign must be copied into [Personal data](#) before you can transmit.
2. A [sound card](#) must be selected.
3. The [CAT](#) must be configured if required or the PTT method must be input to the CAT information.
4. The [waterfall](#) may need adjustment for correct display.
5. Check the band limits in the [Band map](#) are correct for your licence conditions.
6. If this installation is overwriting a previous installation the log maybe retained. If this is a new installation there will be no log available.

An option is offered to [import a MixW log](#) from a previous MixW3 version.

If this option is not used a log import maybe achieved using the Log search tools later.

The first screen after this start is always the Personal data screen from the Settings - Config Dialog menu.





Although this screen is displayed to allow input of your personal details you can select other menu items (eg Settings or Band map) to further configure MixW4 at this time.

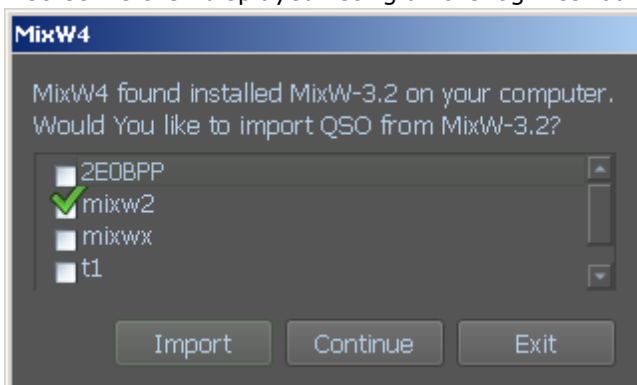
If you are overwriting a previous MixW4 release and have elected to retain the MixW4.ini file and Multipan.db3 database file your personal details will be shown and other settings should be retained from the previous release.

The Registration will still show Unregistered. Registration will occur once you have filled in your callsign and the Save control is clicked.

When you have finished click Save on whatever screen you are on. This will save all your new settings and you may get an option to load a MixW3 version log file.

The method of loading a MixW3 log differs slightly from the method used by the [Log search](#) function. MixW4 identifies a previous MixW3 installation and offers an option to import one or more logs found in the MixW3 *data\_root* folder These files must have a suffix of *.log*. **It will not search in any other folder.**

A screen is then displayed listing all the log files found.



You must tick one box only and import it.

Repeat the action for each file you wish to import.

After each import check if any errors are reported.

The error(s) will be shown in the file `{data_root}\bad_qso.log`.

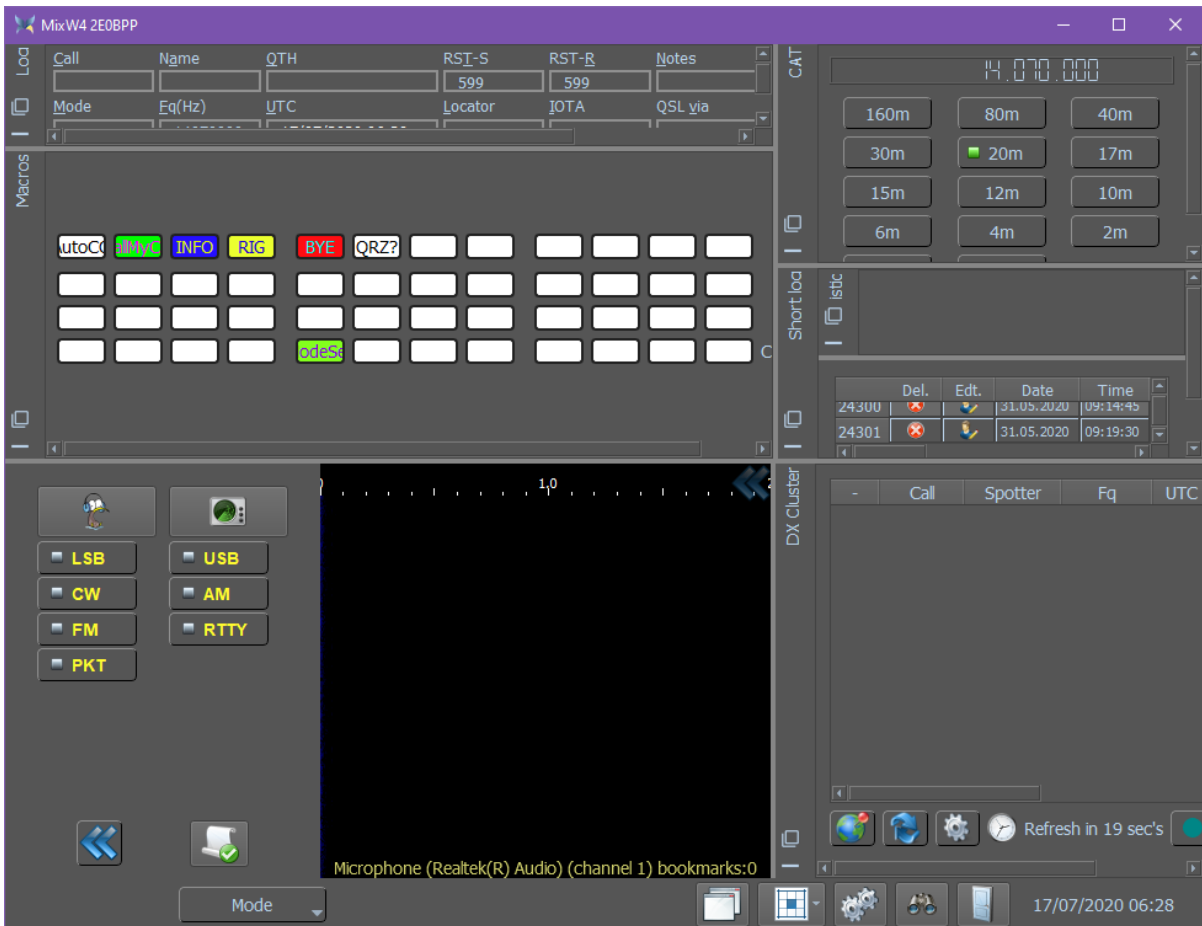
The next MixW3 log import will cause this file to be reset so you must save each file that causes errors to be generated.

Once you have finished your import(s) click Continue to go to the next step or Exit to quit MixW4.

**Note:** I always exit MixW4 and then restart after the option to import MixW3 logs.

If a problem occurs during the next steps I have found I can lose some (but not all) of my settings.

Whether you continue or exit and restart you will be presented with the following screen:



Click on the Mode button and select the mode you want. If you are going to make audio adjustments select PSK. This will bring up transmit and receive windows with the associated Receive Mode Status Bar and Transmit controls.

You must now adjust the main window size as necessary and select and resize any other windows you want to display.

Use the [Main Menu](#) Show/Hide Views to show or hide windows and [Resize Window](#) to adjust the size and position of the windows.

You can save a layout at anytime by using the [Main Menu](#) Save/Load/Restore screen layout and can load a previously saved layout as required.

You will find this is an ongoing activity as you become more familiar with MixW4's capabilities. This now completes the First Start actions.

## Normal Start

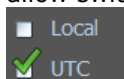
MixW4 will restart using the same layout as your last MixW4 session.

## Main menu items

The Main menu is located at the bottom right of the MixW4 main window.



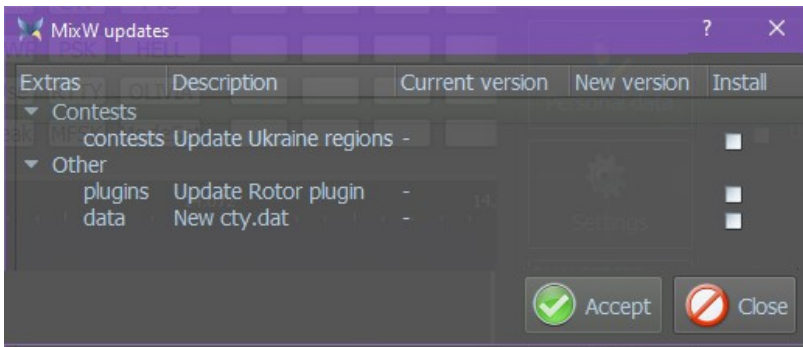
- 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
1. Only displayed if Updates are available
  2. Show/Hide Views
  3. Save/Load/Restore screen layout
  4. Settings
  5. Show QSO log and maintenance tools
  6. Show log statistics
  7. UTC Date and Time. Right click on this field to allow switch between Local and UTC time.



The order of the Main menu items may vary.

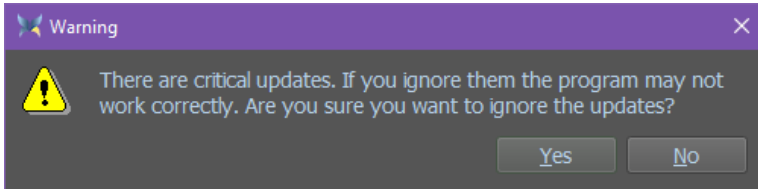
### Updates available

Only displayed when new updates are available. Clicking on this menu item displays a selection screen.



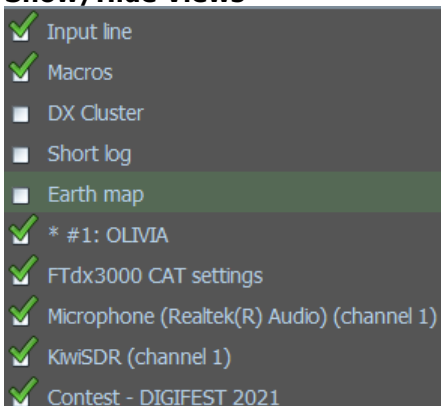
The updates available are displayed. Tick the Install boxes of the updates you wish to install then click Accept.

The following message box is displayed when not all critical updates are installed.



Click **Yes** to continue  
Click **No** to return and install further updates.

### Show/Hide Views



Input line. [QSO input](#) to log

[Macro bar](#)

[DX Cluster](#)

[QSO Statistics and Short log](#)

[Earth Map](#)

Each active mode has a separate Rx window.

[CAT](#) settings. Current transceiver file.

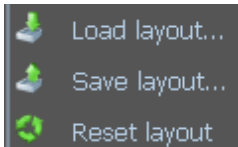
[Waterfall](#) (Spectrum) audio input channel.

[KiwiSDR](#) Waterfall (channel 1)

Current [contest](#) running. Not visible if not in contest mode.

Show/Hide view items order may vary.

### Save/Load/Reset screen layout



**Load layout** - restore a previously saved screen layout

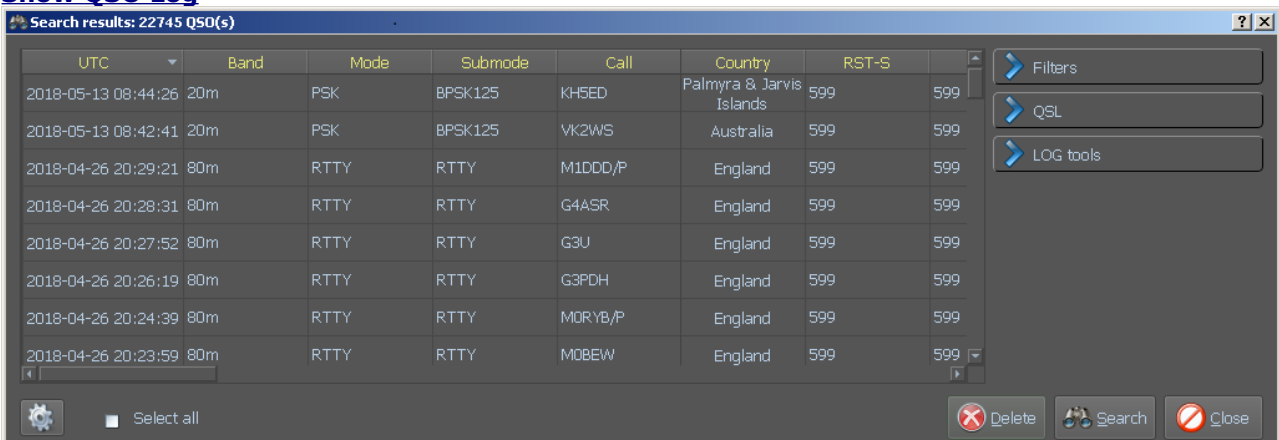
**Save layout** - save the current screen layout to a file

**Reset layout** - set the screen to a preset layout

Layout files have a *.layout* suffix and are stored in the *{data\_root}* folder.

**Settings** - [Show Config Dialog](#)

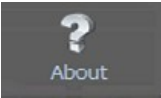
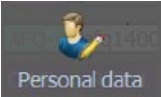


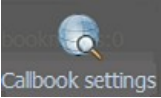
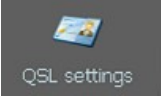
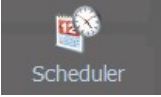
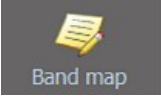
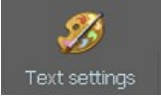
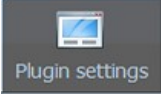
### Show QSO Log



## Settings - Config Dialog

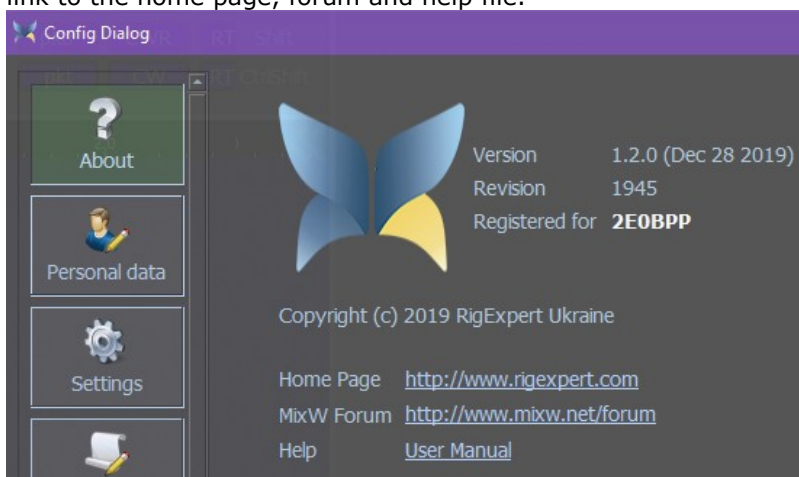
For detailed configuration of the MixW4 program, open the Settings window (Settings)

The Config Dialog allows detailed configuration of the basic MixW4 settings.

	Displays information <a href="#">about</a> the program.
	Input <a href="#">personal details</a> and station information.
	Displays the <a href="#">Settings</a> dialog.
	Edit/Create <a href="#">macros</a> . Import and convert macros from MixW2/3.
	Username/password for the <a href="#">callbook</a> login.
	Username/password for <a href="#">QSL</a> .
	<a href="#">Schedule</a> timed actions and/or reminders.
	Modify the <a href="#">Band map</a> .
	Select <a href="#">text/background</a> colours.
	Assign names and parameters to the <a href="#">plugins</a> .

## About

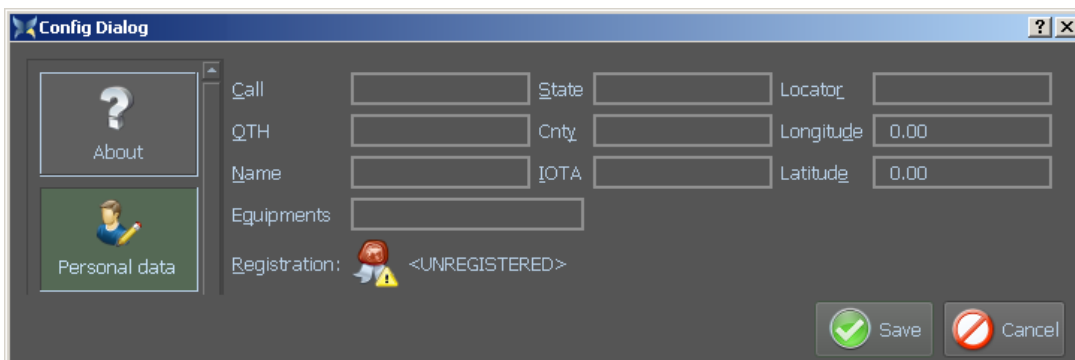
The first tab displays basic information about the program version, mode: demonstration or full registration, a link to the home page, forum and help file.



## Personal data

In this tab you can enter information about your station.

The first time you start MixW4 after an installation the Config Dialog - Personal Data screen will be shown.



If this is an installation where there is a new MixW4.ini file this screen will have no data filled in but if you have retained your MixW4.ini file the data you previously entered will be displayed.

If necessary fill in a minimum of your callsign to be able to transmit.

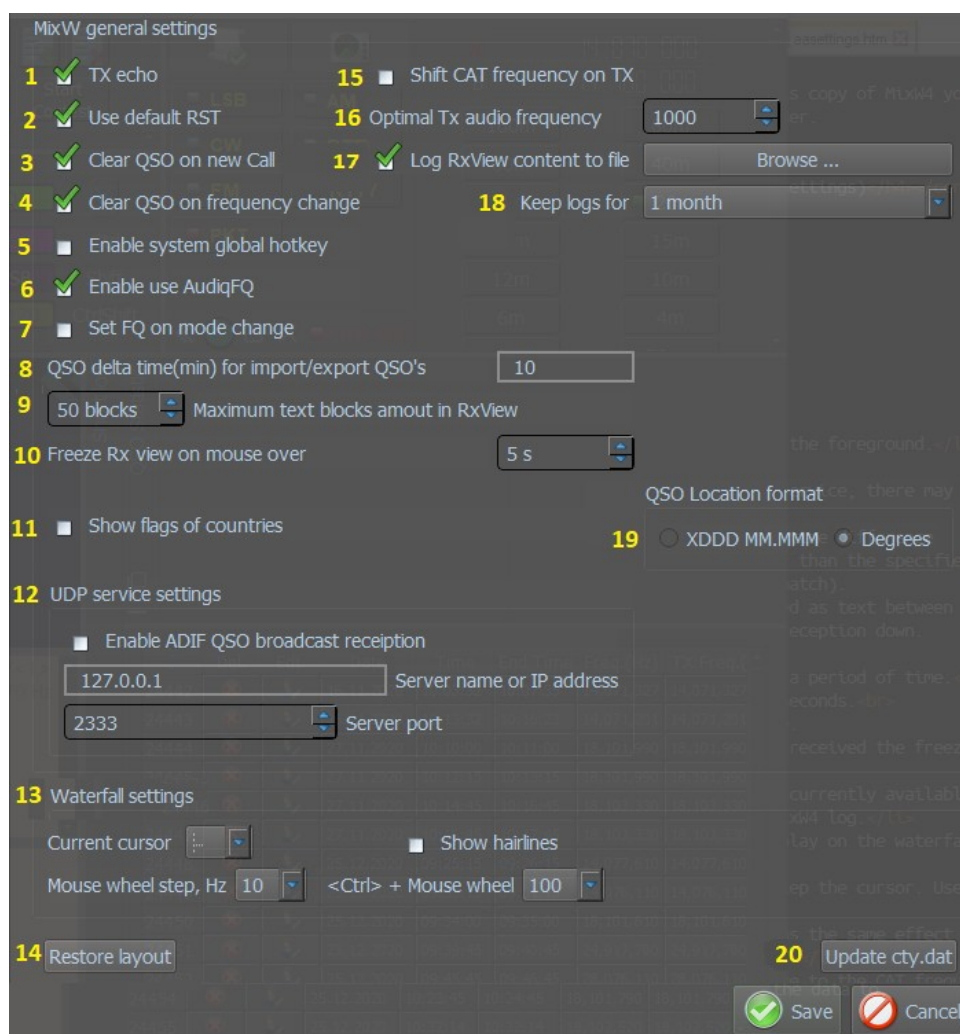
If you fill in the Latitude and Longitude MixW4 does not fill in your Maidenhead locator for you. However if you know your Maidenhead locator and you fill this field in MixW4 will fill in Latitude and Longitude values for the centre of your grid square.

**Note:** If your location is South of the Equator your Latitude value will be negative. If your location is West of the Greenwich Meridian the Longitude value will be negative.

The data entered into the Equipments field will be displayed by the Macro <MYEQUIPT>

When you finally save your Personal data if you have paid for this copy of MixW4 you should now find you are a [registered](#) user.

## MixW general settings (Basic settings)



1. Display the transmitted text in the receiving window.
2. Use 599 for the default report.
3. Clear all QSO data when a new callsign is entered.
4. Clear all QSO data when the frequency changes.
5. Enable System global hotkey. Pressing Escape brings MixW4 to the foreground.
6. Displayed frequency includes the Audio frequency.
7. Set the default frequency (as set in the band map) for a MixW4 mode change when the band is not

- changed. When unset this allows QSOs on the same frequency in different modes.
8. Setting the time for eQSL. After loading data from the eQSL service, there may be a problem with a time mismatch between your log and the sender's log.  
This setting allows you to set eQSL received in your log (if the time difference is within the specified limit). If the time difference is greater than the specified limit a new log entry will be needed (All other parameters must match).
  9. Number of data blocks in the RXView window. A block is classed as text between <CR> and <LF> characters. Too many blocks slows the reception down. 50 is a good compromise.
  10. The cursor in the Rx window causes the display to freeze for a period of time.  
Select the time length in the control to the right. Preset is 5 seconds.  
Whilst the window is frozen there is a red border around the edge. The freeze time is for actual data reception if no data is being received the freeze time is suspended.
  11. Display the flags of countries in the log. Not all flags are currently available.
  12. Enable QSOs from third party software to be entered in the MixW4 log.
  13. Waterfall settings.  
Select the shape of the cursor to display on the waterfall.  
Show hairlines creates additional tuning lines in the waterfall for digital modes.  
Set the number of Hertz the Mouse wheel will step the cursor. Use the Control key for coarse adjustments.
  14. Set the MixW4 screen layout to its original settings. This has the same effect as the *Main Menu - Save/Load/Restore screen layout - Reset layout*.
  15. Shift the Audio frequency on TX.
  16. Select the number of Hertz to shift relative to the Audio frequency when in transmit.
  17. Log RxView content to file. Select the file name to save the data to. The default file name is `MixW4.Rxn.yyyy.mm.dd.txt`.  
The data is saved in folder `{data_home}\RxLog}`
  18. Select how long to keep the saved audio files.
  19. Select XDDD MM.MMM or degrees for the location format.
  20. After copying the latest `cty.dat/pfx.dat` file(s) to the `{data_root}\Data` folder update the running MixW4.

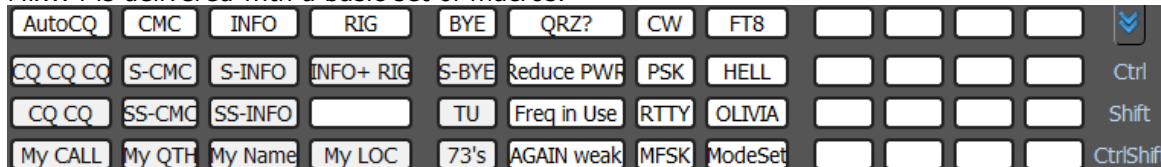
## Configuring Macros

MixW4 Macros provide a method to help control the functionality of MixW, your CAT equipped transceiver and to reduce the need of repetitive typing. There are 48 locations available for macros but these may be changed by selection of different operating modes or contests.

The default storage location for non-contest macros is `{data_root}\Macros`.



The default storage location for contest macros is `{data_root}\Contests\Macros`.

MixW4 is delivered with a basic set of macros.



As delivered they are displayed in 4 rows of 12. Any macro can be executed by positioning the mouse cursor over the macro location and left clicking or by using a combination of the Ctrl and Shift keys to select the row the macro is in and using the relevant Function key.

In the delivered macros by pressing Ctrl+Shift+F5 the Mode settings dialogue window is displayed.

The  control reduces the number of macro rows displayed from 4 to 1. The row displayed can be controlled by the Ctrl and Shift keys. The display can be restored by clicking on the  control.

There are 3 possible methods of configuring your macros.

1. Use the Edit user macro window.
2. Edit (**with care**) the relevant `.json` file in the `{data_root}\Macros` folder using a text editor.
3. Import and convert macros from a previous MixW release.

## Edit macro.

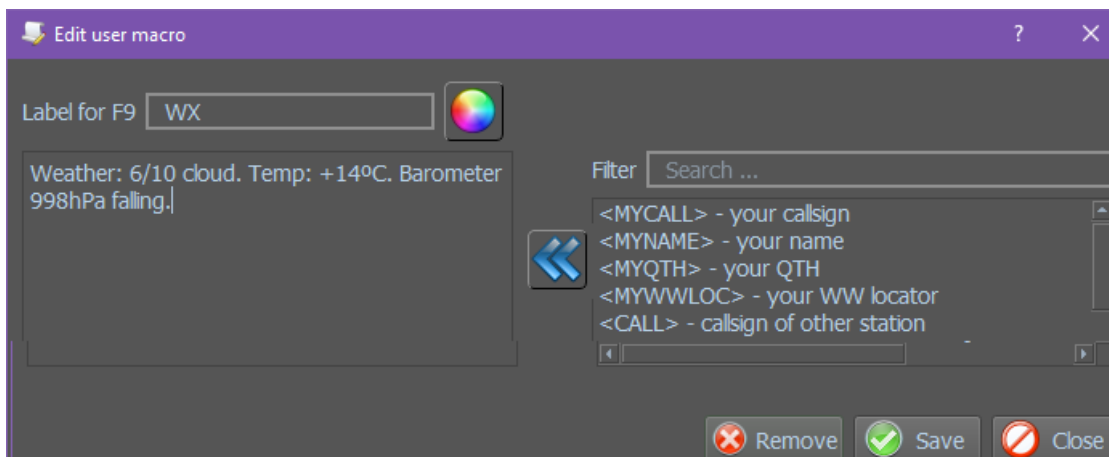
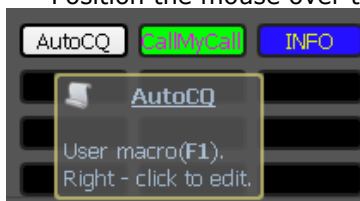
Name	Label	Text
F1	AutoCQ	<AUTOQCQ:10><TX>CQ CQ CQ de <MYCALL> <MYCALL> <MYCALL> ...
F2	CMC	<TX><CALL> de <MYCALL> <MYCALL> <MYCALL> KN<RXANDCLEAR>
F3	INFO	<TX><CALL> de <MYCALL> <MYCALL>Thanks for the Call dear ...
F4	RIG	<TX><CALL> de <MYCALL> <MYCALL>My equipment is:Software : <V...
F5	BYE	<TX><CALL> de <MYCALL> <MYCALL>Many thanks for nice QSO dear...
F6	QRZ?	<TX>QRZ QRZ de <MYCALL> <MYCALL> <MYCALL> k..<RXANDCLEAR>
F7	CW	<MODE:CW><CLEARTXWINDOW>
F8	FT8	<MODE:FT8><CLEARTXWINDOW>
F9		
F10		

To get the Edit user macro window either:

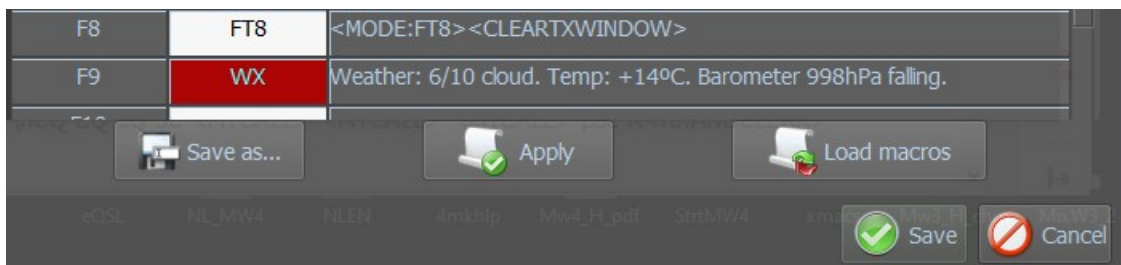
Select Macros from the Settings tab and double click on the row you want to change or create

Or

Position the mouse over the macro in the macro bar and right click.



Once the changes are complete click on save and repeat for any further macros to be changed.



When all the macro changes have been complete click on Apply and then Save, to save the macros to the relevant .json file.

## Edit Macros.json file

MixW4 macros have the facility to call one macro name from another macro.

An example using the WX macro created above:

<TX><GA> <NAME> <F7> we have a storm coming. BTU <CALL> de <MYCALL><RXANDCLEAR>

Using the normal macro edit (above) each macro has the name of the key number as the macro name.

The only way to assign these macros their name is to manually edit the raw macro data.

As delivered the first few lines of Macros.json are:

[

```

{
  "Macros_1": {
    "color": "#ffffff",
    "label": "AutoCQ",
    "text": "<AUTOCQ:10><TX>\nCQ CQ CQ de <MYCALL> <MYCALL> <MYCALL> pse K<RXANDCLEAR>"
  }
},
{
  "Macros_2": {
    "color": "#00ff00",
    "label": "CMC",
    "text": "<TX>\n<CALL> <CALL> de <MYCALL> <MYCALL> KN<RXANDCLEAR>\n "
  }
},

```

There is no name associated with these macros.

This is the first macro with a name inserted:

```

"Macros_1": {
  "color": "#ffffff",
  "label": "AutoCQ",
  "name": "F1",
  "text": "<AUTOCQ:10><TX>\nCQ CQ CQ de <MYCALL> <MYCALL> <MYCALL> pse K<RXANDCLEAR>"
}

```

It is normal practice to use the function key name as the macro name but the name can be any combination of letters and numbers.

This is useful if you want to use the contest [Intellegent macros](#) in non-contest mode.

As you gain experience with using MixW4 you may identify areas where use of these Intellegent macros will be advantageous for you. However you will have to sacrifice up to 7 of the 48 macros to make full use of the facilities.

This is an example of a pair of macros I use. I use a CQ macro but can call this from an AUTOCQ macro as well.

```

"Macros_1": {
  "color": "#90601f",
  "label": "CQ",
  "name": "F1",
  "text": "<TX>\nCQ CQ de <MYCALL> <MYCALL><CRLF>cq cq de 2e0bpp 2e0bpp cq
          pse k<RXANDCLEAR>"
}

"Macros_41": {
  "color": "#ff00ff",
  "label": "ACQ",
  "name": "Ctrl-Shift-F5",
  "text": "<AUTOCQ:10> <F1>"
}

```

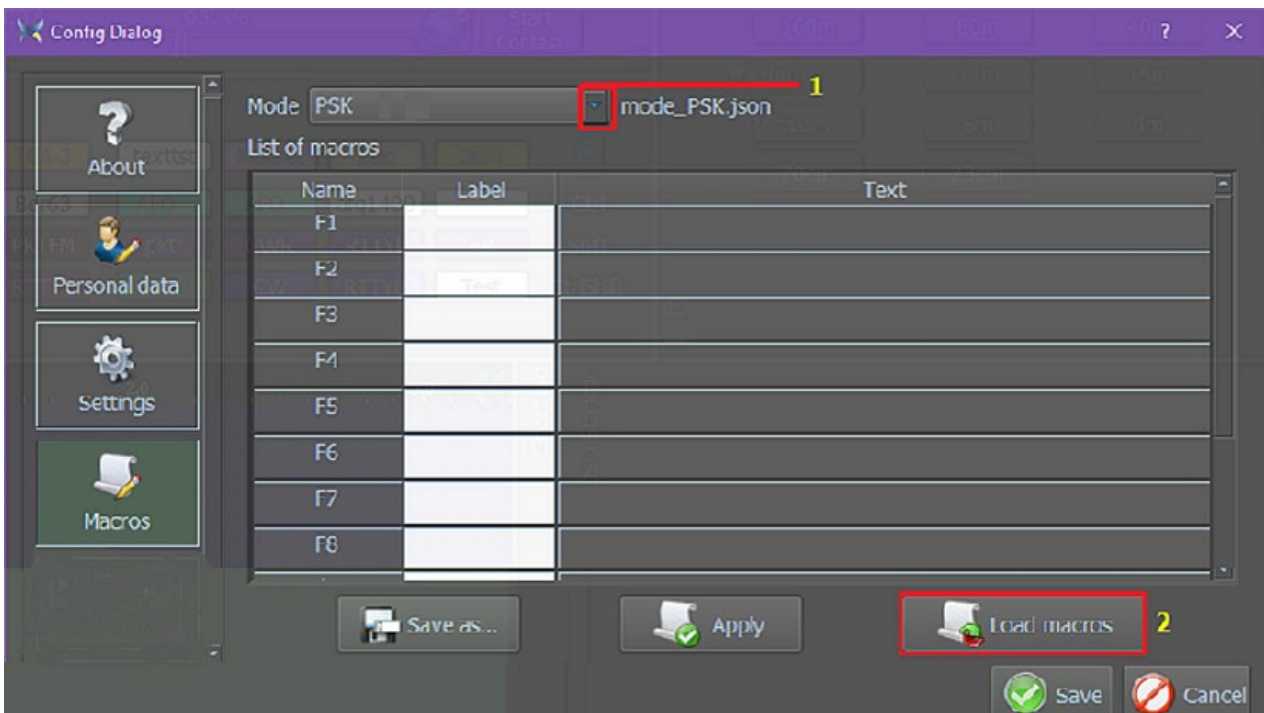
When running from the AUTOCQ macro it has to be ended with the Escape key.

## Import macros.

Macros may be imported from a previous release of MixW4 or a previous version of MixW (MixW2 or MixW3). If the macros are being imported from a previous version MixW4 will convert them to MixW4 format.

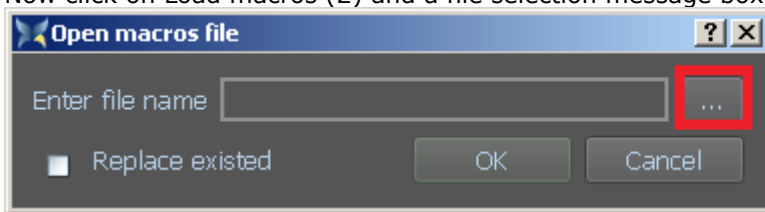
Before starting the import, identify the macro file(s) you wish to import. If these files are from a previous version make sure the files have a .mc extension. If you wish to import the *MixMacros.ini* file this must be renamed *MixMacros.mc*.





Select the Macros tab from the Config dialog screen. On this screen click the ▼ (1) and from this list select which macro set you wish to update.

Now click on Load macros (2) and a file selection message box will be displayed.



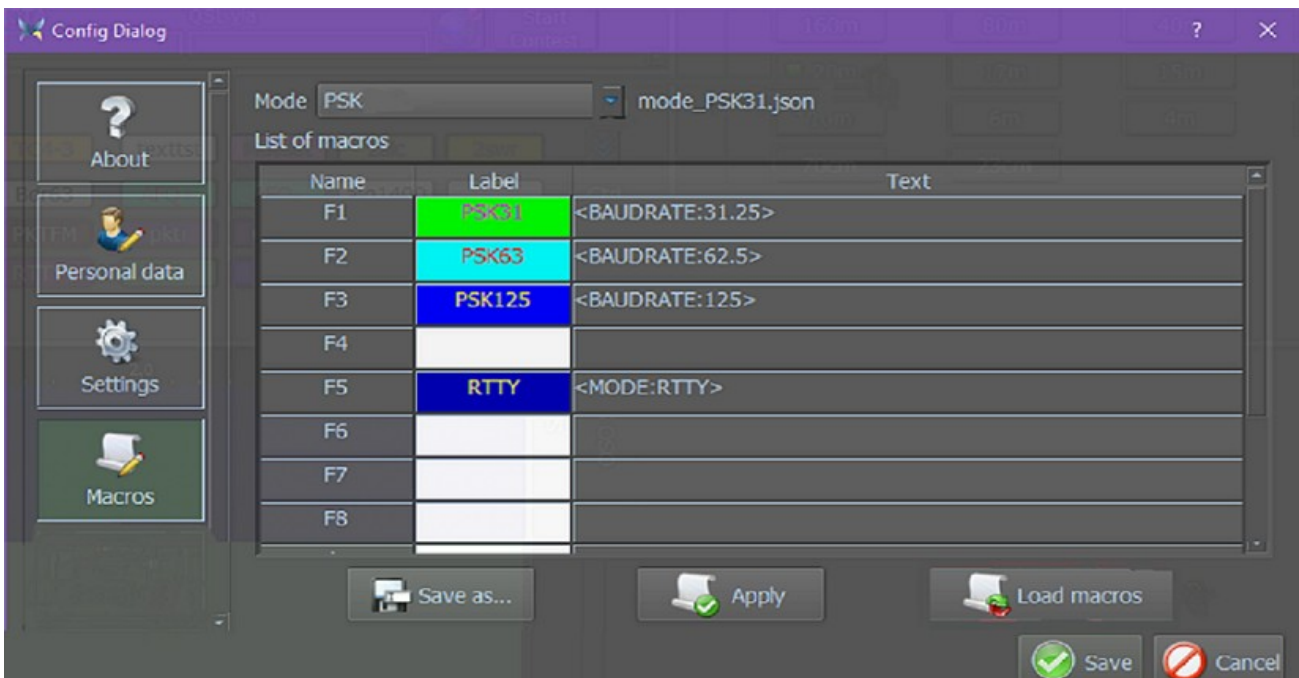
Click to display file selection window.

Once the file has been selected click OK in the message box.

These are MixW3 BPSK31 macros to be imported and converted:

```
[Macros]
nItems=4
Name0=F1
Label0=PSK31
Text0=<BAUDRATE:31.25>
BkColor0=65280
Name1=F2
Label1=PSK63
Text1=<BAUDRATE:62.5>
BkColor1=65535
Name2=F3
Label2=PSK125
Text2=<BAUDRATE:125>
BkColor2=255
Name3=F5
Label3=RTTY
Text3=<MODE:RTTY>
BkColor3=180
```

The converted macros are now displayed.



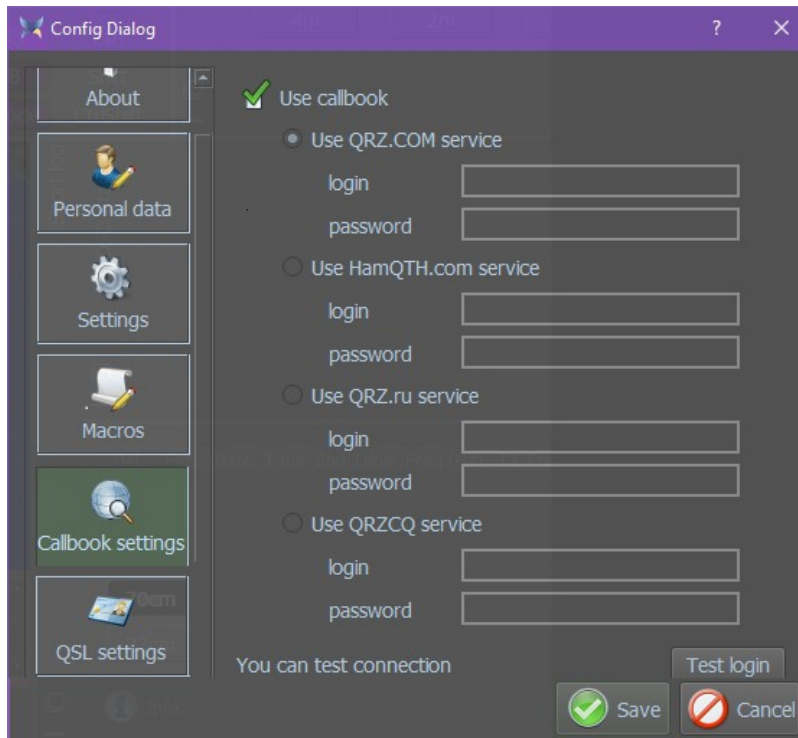
If you are satisfied click Apply and repeat the Import macros for any other files you wish to import.

Once you have completed your imports click Save.

**Warning: Not all MixW3 macros convert correctly to MixW4.**

A list of all [MixW4 macros](#) can be found in the Appendices.

## Callbook settings.



Tick Use callbook to enable the callbook.

Select one of the four services.

You must be registered with the service.

Enter your login and password details.

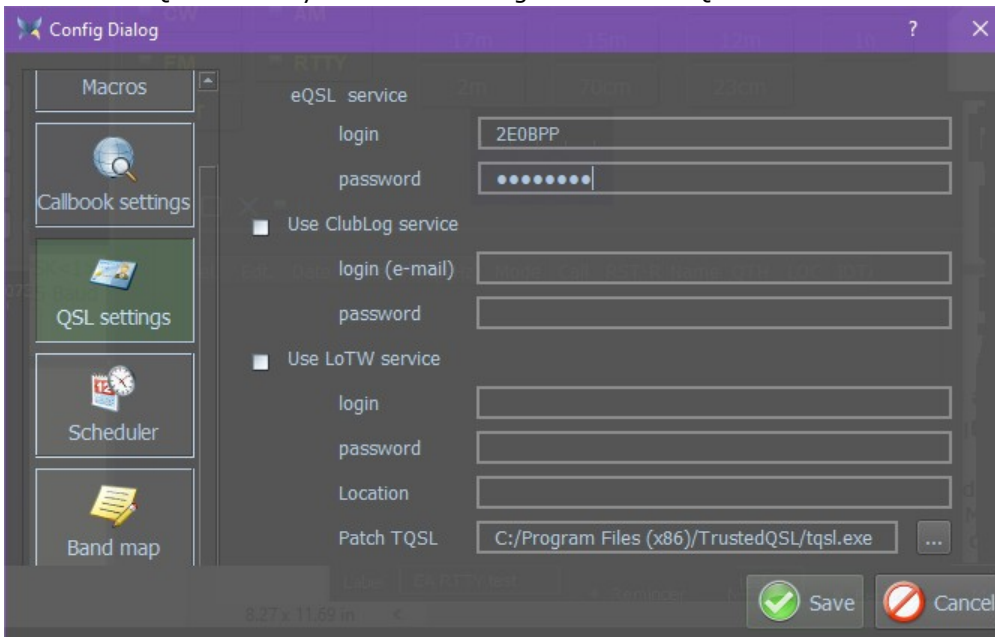
Click Test login to check for correct details.

If login is OK *You can test connection* changes to *Success*.

Finally click Save.

## Setting up the eQSL service

To use the eQSL service you must have registered with eQSL.



The eQSL service is always selected.

To activate eQSL fill in your login and password details.

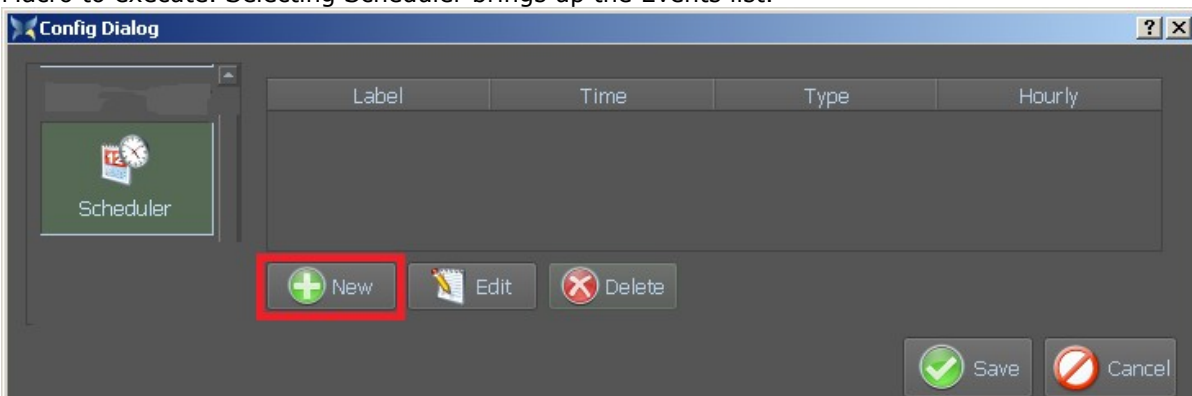
If you are registered with Clublog and wish to make use of the MixW4 service fill in your login and password details.

If you are a LoTW user fill in your user details if you are going to use this facility.

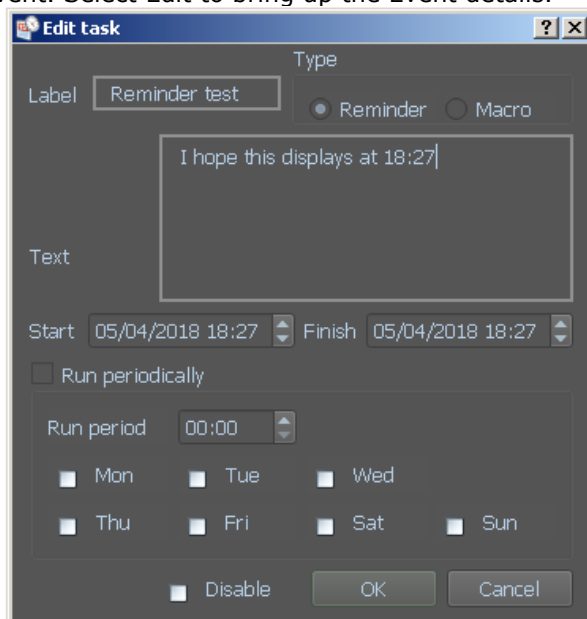
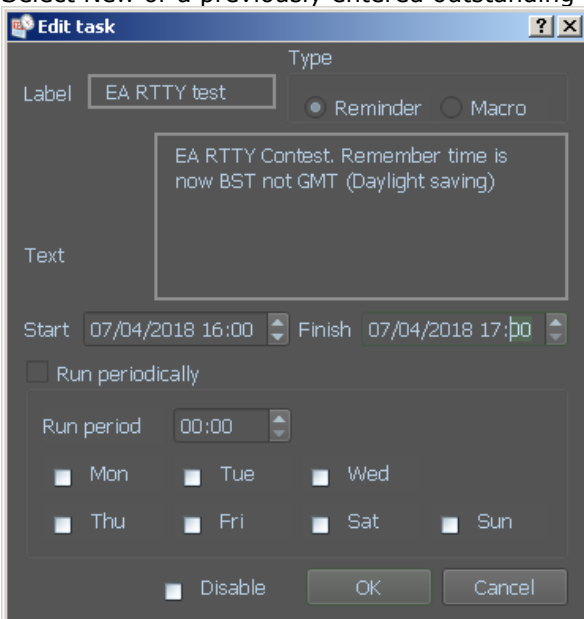
Finally click Save.

## Scheduler

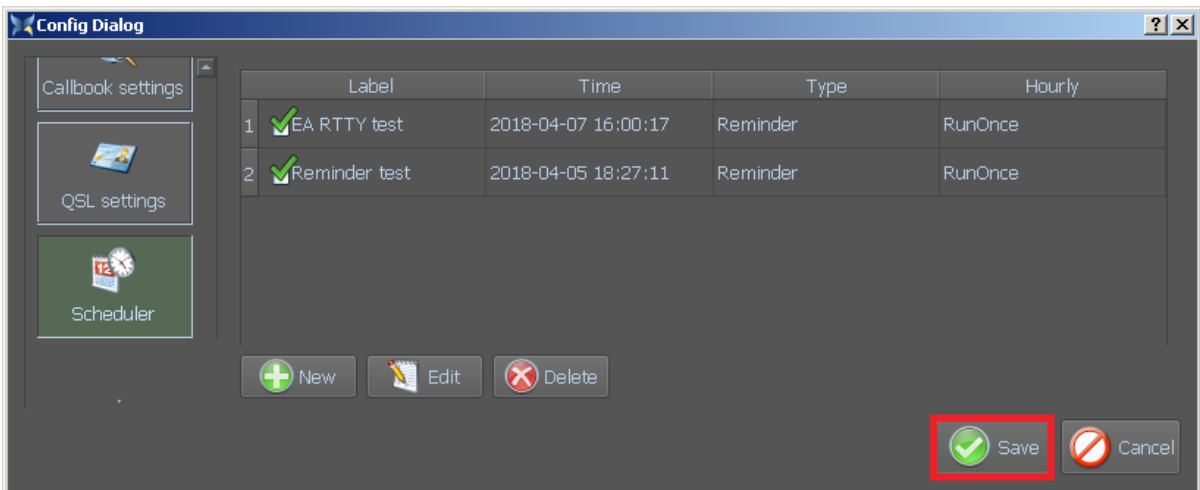
Scheduler allows the MixW4 operator to specify an Event by date and time. The Event can be a reminder or a Macro to execute. Selecting Scheduler brings up the Events list.



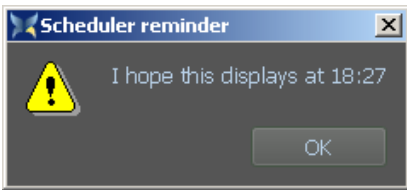
Select New or a previously entered outstanding Event. Select Edit to bring up the Event details.



Click on OK to save the details.



Click Save to start Scheduler.



It did.

Any unactioned or repeat activities are copied to the *schedule.txt* file in the *{data\_root}\Data* folder in ADIF style format when MixW4 exits.

## Band map

Allows viewing, back up or modification of the Band map.

Select Band map from the Config dialog menu.

**Note: the Band map should be checked after installation to ensure band limits are correct for your region.**



## Band map description

The Band map defines the limits of the ham bands MixW will operate in and allows configuration of personal choice in frequency and mode selection.

	Band	Mode	Start Fq	Def. Fq	End Fq
1	160m	ALL	1810	1838	2000
2	160m	CW	1810	1820	1838
3	160m	MFSK	1838	1838	1843

Each line in the Band map consists of 5 data columns. The lines for each band are grouped together for readability but do not have to be in any particular order.

The entries are:

Band	Mode	Start Fq (khz)	Def.Fq (khz) <i>See below</i>	End Fq (khz) <i>See below</i>
Numeric data in metres or centimetres with m or cm appended to the figure	A mode that can be selected from the Modes menu. Can also be <b>ALL</b> which defines the Start and End frequencies for this band. The Default frequency is selected if no recognised Mode is selected.	The lower frequency within the band for this MixW Mode.	The Default frequency MixW will set when switching to this band in this mode.	The upper frequency in the band for this MixW mode.

**Note:** when the Band map is saved the **Def.Fq** and **End Fq** columns are swapped over in the saved file. This is to allow the same format to be used to download previous band plans (file name *bands.ini*).

### Mandatory requirement

For a band to be visible in the CAT display and useable a line must be included:

*{band\_name}* ALL *{Min\_freq (khz)}* *{Max\_freq (khz)}* *{Working\_freq (khz)}*.

This defines the band minimum and maximum frequencies.

This requirement means that a change may be needed to the MixW2/3 bands.ini file before it can be used in MixW4.

These are the default entries for the MixW3.1.1h delivered *bands.ini* file for the 20 metre (14mhz) band.

; 20m band

20m SSB USB 14100 14350 14100 ; Defines the upper band limit  
 20m CW CW 14000 14350 14010 ;Defines the lower and upper band limits  
 20m RTTY DEFAULT 14065 14112 14080  
 20m BPSK31 DEFAULT 14065 14112 14070  
 20m QPSK31 DEFAULT 14065 14112 14070  
 20m FSK31 DEFAULT 14065 14112 14070  
 20m PACKET DEFAULT 14065 14112 14105  
 20m HELL DEFAULT 14065 14112 14062  
 20m SSTV USB 14220 14240 14230  
 20m ALL DEFAULT 14065 14112 14070 ; **Remove this line. See Mandatory requirement above.**

There are similar entries for most of the bands.

**The format above must be used for band information that will be used in a file to Import information.**

### Band map modification - Minor changes.

The delivered Band plan does not conform to the band limits for all countries. Adjustments may need to be carried out. The upper band limit for 80m is 4000khz in some countries but the delivered upper band limit is 3800.

8	80m	ALL	3500	3600	3800
---	-----	-----	------	------	------

Identify the line you need to change.

8	80m	ALL	3500	3600	4000
---	-----	-----	------	------	------

Moving the mouse pointer to the entry to be changed. Double click to enter edit mode and make the change(s).

8	80m	ALL	3500	3600	4000
---	-----	-----	------	------	------

When editing is finished use the right slider to check for any [Invalid entries](#).

Now Finally click on Save.

Click on the **Add band** control to add a single line to the band map.



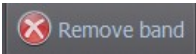
	Band	Mode	Start Fq	Def. Fq	End Fq
1		ALL	0	0	0
2	160m	ALL	1810	1838	2000
3	160m	CW	1810	1820	1838

A blank line is created in the band map at position 1.

Enter the new band details. This will position the new line in the appropriate band section. Now check for validity of the entry.

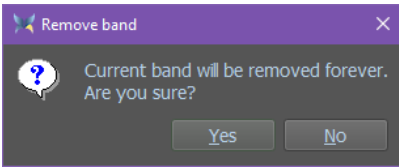
**Note:** To add a whole new band can be very time consuming. See the Major changes section below.

Use **Remove band** to delete a single line from the band map.



Select the line to be deleted in the band map.  
Now click on the Remove band control.

A message box will appear.



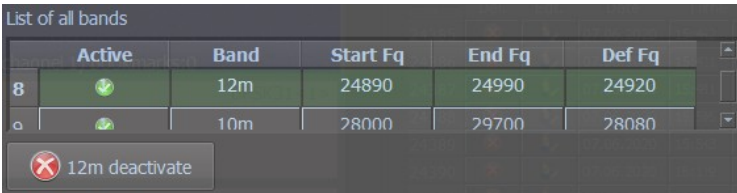
Click yes or type the letter Y to delete the line.

**Note:** As with the Add band, to delete a whole band could be very time consuming. See the Major changes section below.

### Deactivate/Activate band.

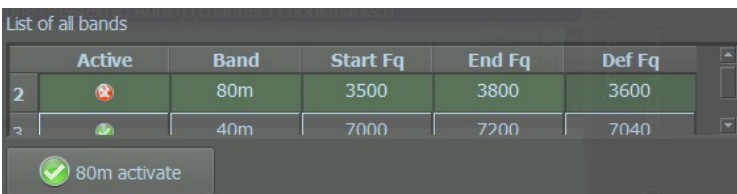
These actions are not permanent changes. They can be reversed later if necessary.

Use the scroll bar on the List of bands to identify the band you are going to change and select it.



An active band will display a in the Active column.

The deactivate control will show a with the band number to be deactivated.



A deactivated band will display a in the Active column.

The activate control will show a with the band number to be activated.

Click on the Deactivate or Activate control.

A message box asking for confirmation of the action is displayed.

If confirmed this will reverse the setting in the List of bands, remove or replace the entire band entries in the Band map and remove or replace the band in the CAT window.

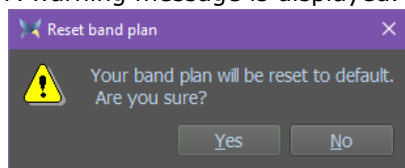
Click Save to activate the changes.

### Band map modification - Major changes or complete replacement.

To make major modifications to a currently installed Band map take a backup of the Band map and use a text editor to make the changes to the saved .ini file. Finally install the newly saved file using Import control.



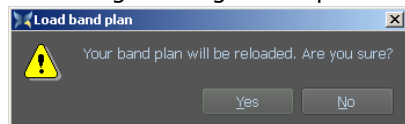
This control Resets the band map to the delivered state.  
A warning message is displayed.



Click Yes, wait 5 seconds. Any changes made will now be removed.



Load a modifications file, in MixW3 bands.ini format, to the running band map  
A warning message is output



Click on Yes, or press the y key. A file selection window will be displayed.

Select the file you wish to import and click on Save. Wait 5 seconds and this file is now merged with the existing band plan data.

Now check the updated data to check for validity of the input data. Lines in yellow have been changed but are OK.



Once any changes have been made Export the changes.  
This brings up a file selection window.

Enter the filename and click on save. The back up file is now created.

The data format is the same as the *bands.ini* file from MixW3.

### Data validity check

**\*) Invalid entries marked in red** Invalid entry found.

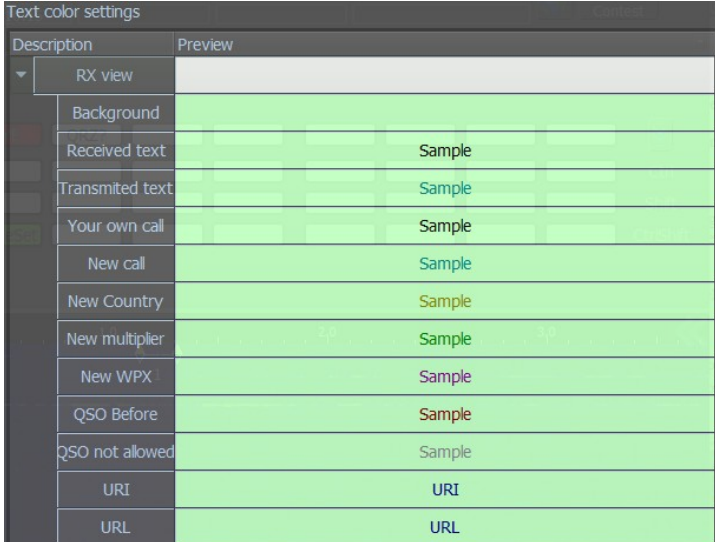
**\*) Modified entries marked in yellow** Changed/inserted line.

A validity check is carried out on the Band map information when the Band map setting is opened and after any changes are applied. If any inconsistencies are found the entry or entries are changed to red. You will need to use the side scrollbar to check for errors. There is no warning that hidden entries have errors.

## Text settings

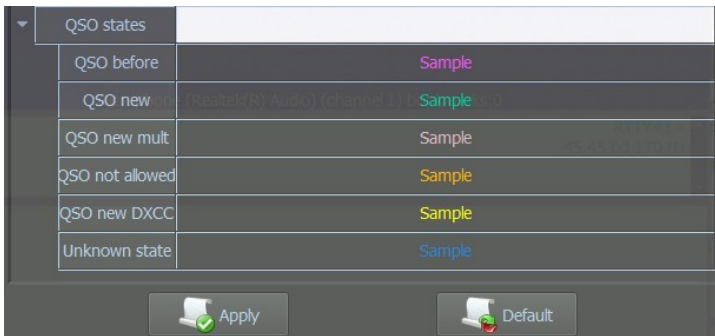
Select your colour preferences.

**Warning: Make sure the foreground and background colours do not clash. Some of the settings are used in more than one screen.**



### The Rx view section

Only applies to the Rx window.

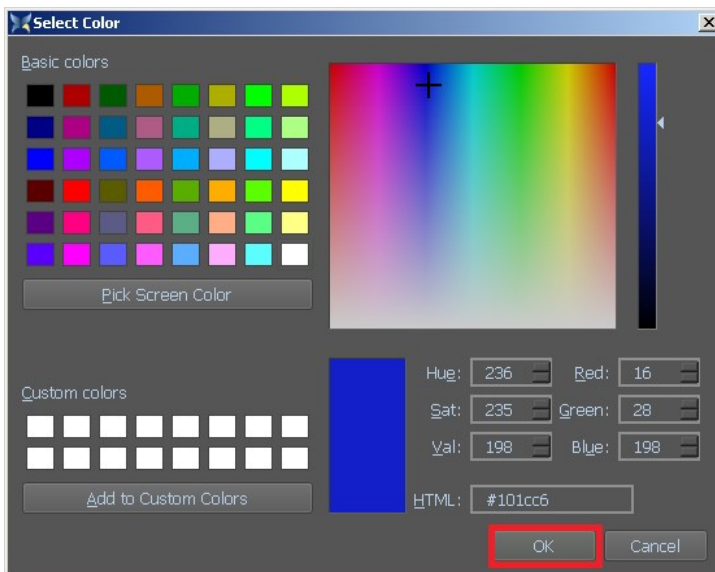


### The QSO states section

Defines the Contest mode text colours.

These settings can also affect the FT4/FT8 text colours, The DXCluster display, The QSO Statistics display The Earth map square colour.

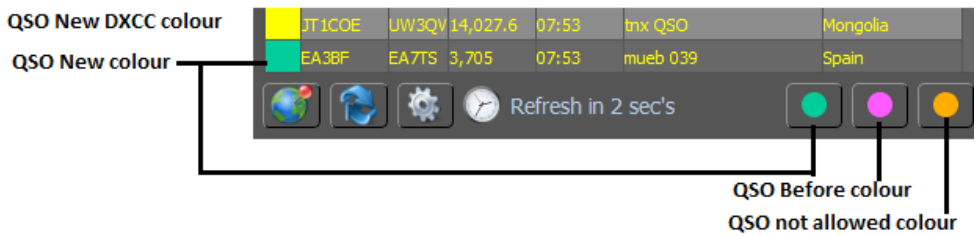
Position the mouse in the item you wish to change and double click. This brings up a colour palette selection window.



Once you have selected the colour click on OK. Repeat for any other items you need to change.

Finally click on Apply and then Save. The changes are applied immediately to the windows.

### Colour selection for the DX Cluster



## Plugins.

MixW4 has a facility to introduce extra functionality with the use of Plugins. These are extra tools made available to assist users by improving operational capability. The plugins are found in the `{Data_root}\MixPlugins` folder. 4 plugins are currently available.

Available plugins and settings					
Plugging name	Auto load	Name for macros	Parameters	Load	
1 Hello World	<input checked="" type="checkbox"/> Start			Load & Show	
2 Quick Start	<input checked="" type="checkbox"/> Start			Load & Show	
3 Base antenna rotator	<input checked="" type="checkbox"/> Start			Load & Show	
4 SQL Tester	<input checked="" type="checkbox"/> Start			Load & Show	

1. **Hello World** - A simple demonstration plugin.
2. **Quick Start** - Using preset SQL to get your callsign.
3. **Base antenna rotator** - Controls a rotator.
4. **SQL Tester** - Create your own SQL to read data from the multipan.db3 database.

The column names in the table:

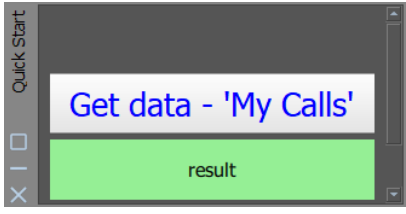
- **Plugin name** - The name of the plugin.
- **Auto load** - Tick the box to have the plugin start at MixW4 load time.
- **Name for macros** - Use this entry to control loading of the plugin using the `<PLG:>` macro. The name is case sensitive when used in the macro.
- **Parameters** - Parameters for use by the plugin.
- **Load** - Click on the control to start the plugin. Multiple copies of the plugin can run at the same time.

### Hello World



Just displays a picture.

### Quick Start

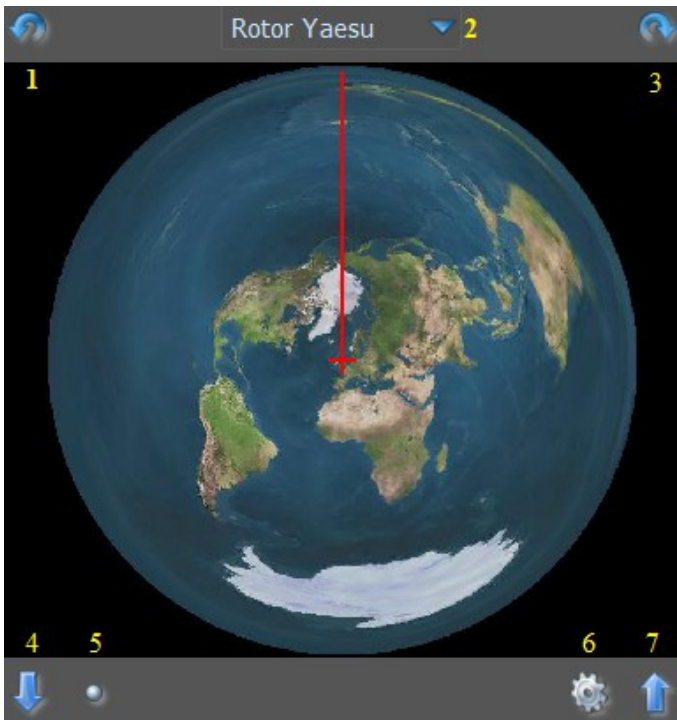


Click on Get data - 'My Calls'

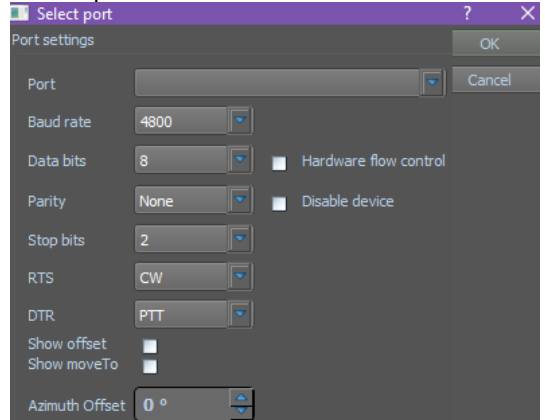
Your call from your last QSO is displayed in the result window.

### Base antenna rotator





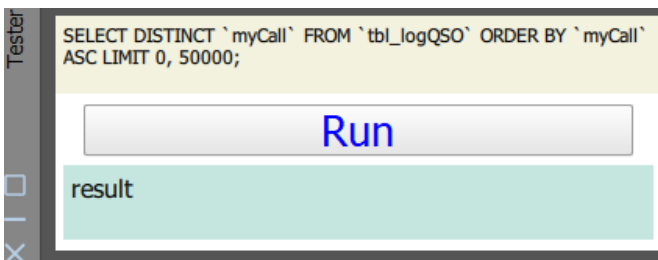
1. Rotate counterclockwise
2. Rotor selection menu
3. Rotate clockwise
4. Rotate to 180°
5. Connection status/Select parameters
6. Select parameters



7. Rotate to 0°

### SQL Tester

This is an Alpha version. Better functionality will be available later.



SQL statement to be executed.

Click Run to execute the statement.

Result in here.

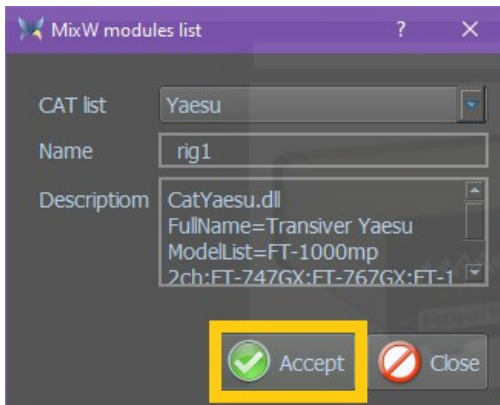
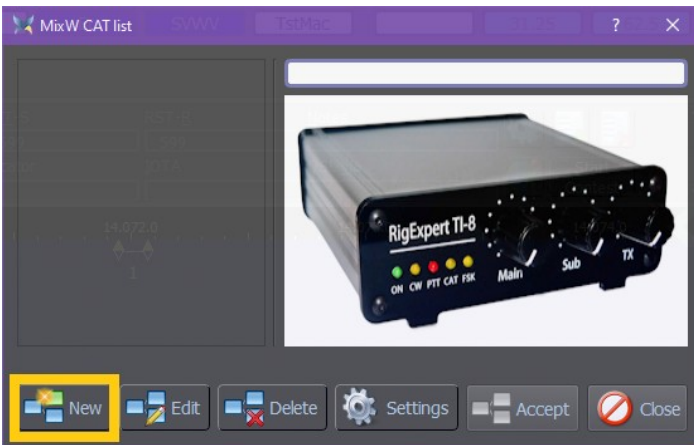
## Configuration CAT

### Configuring the CAT system.



1. [Rig CAT control](#) Macros display/create/edit.
2. CAT Configuration. Left click to enter.
3. VFO frequencies. Selected VFO in red.
4. Available bands (there must be an entry in the Band map) and selected band.
5. Transceiver [mode selection](#). Does not change the MixW4 mode.
6. Cat bar size adjust.
7. Waterfall and Receive window selection colour.
8. Undock/dock for resizing/repositioning of this window.
9. Close CAT information display window.
10. Selected transceiver configuration and colour display of operational status.

To configure the CAT click on item 2 in the picture above.

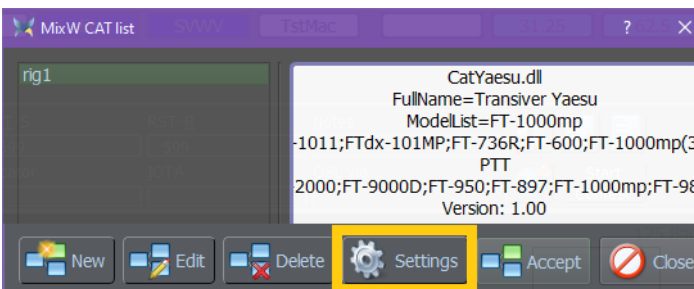


Select the transceiver brand or manufacturer from the Cat list drop down menu.

Enter a record name in the Name box. This can be any name you choose.

You can create more than 1 transceiver record.

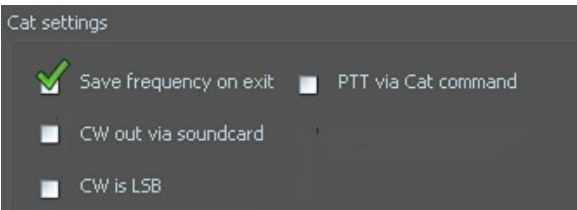
The name for each record must be unique.





This is a drop down list of all the transceivers MixW4 is capable of controlling from your selected manufacturer/brand name.

The model field **MUST** display the identity of the transceiver you are going to control using this CAT configuration or a transceiver with the same CAT control commands and parameters.



**Save frequency on exit.** When MixW4 is closed the transceiver frequency is saved.

**CW out via soundcard.** Not used. The operation is now in the CW Mode settings.

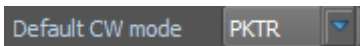
**CW is LSB.** Not used. Now selected by the Default CW mode below.

**PTT via Cat command.** Use the CAT PTT command to switch to transmit. If this is not ticked the transceiver will be switched to TX by either using VOX control, the PTT com port or by manually switching to transmit.

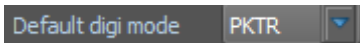


A drop down menu of USB, LSB or FM

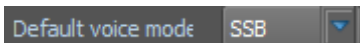
For the next 3 entries the transceiver will not change mode if a value of *None* is selected.



A drop down menu of CW, CWR, USB, LSB, PKT, PKTR or None. For CW via the soundcard use the setting you normally use for digital modes.



A drop down menu of USB, LSB, PKT, PKTR or None. RTTY via FSK is not currently supported. Use the setting PSK runs in for RTTY mode.



A drop down menu of SSB, USB, LSB or None.

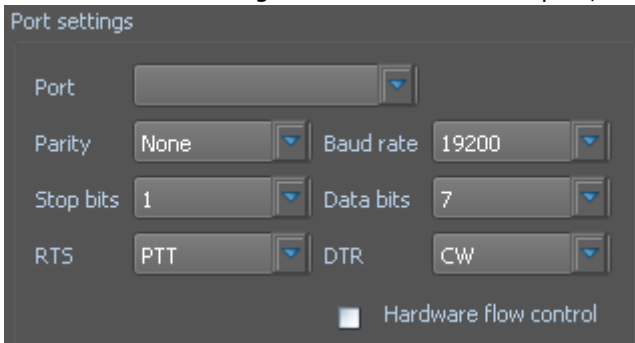


Set the Pitch value for use when running CW via CAT interface. Default 800.



FSK is not yet supported.

The next three settings define the CAT COM port, PTT COM port and Winkey COM port.



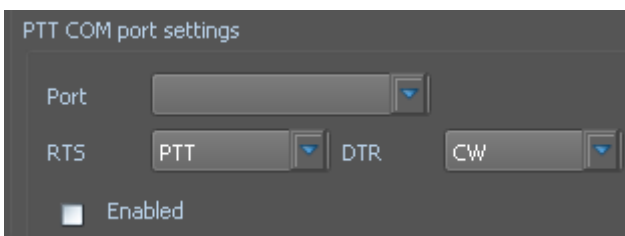
Enter your CAT **Port** number.

**Parity, Baud rate, Stop bits** and **Data bits** must be the same as those set in your transceiver.

If your transceiver can use the CAT port **RTS** and **DTR** lines for control these can be used for PTT and or CW actions.

**Hardware flow control** is very rare in modern transceivers.

If the CAT port can't use PTT and CW commands the PTT com port can provide these functions.

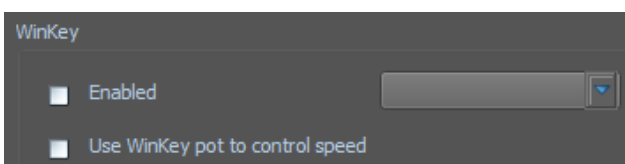


Enter your PTT/CW **Port** number.

Select the function **RTS** and **DTR** are to action from the drop down list for each control.

Click **Enabled** to use this port.

WinKey Port.



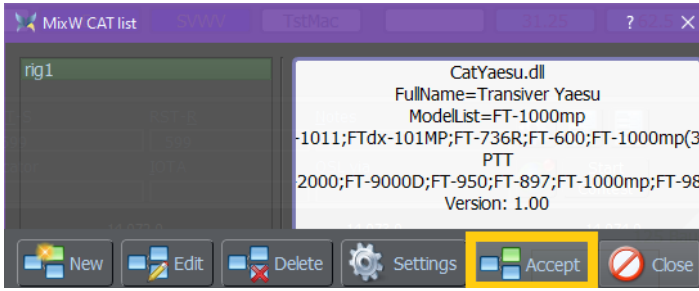
Enter your WinKey port number in the text box.

Select **Enabled** to activate the port.

Select **Use WinKey pot to control speed** if you need to.

Once the CAT settings have been selected click OK. You can return to the settings screen at any time if you

wish to make changes.



Once the CAT settings have been Accepted two files are created in the *data\_root* folder.

Catlist.json - The list of all the supported transceivers for the brand name and the name(s) of the settings file(s) created.

Cat{brand}.json - The contents of the individual CAT settings file(s).

## Rig CAT Control

Further transceiver control is possible by specifying individual CAT commands.

These commands may be found in the appropriate manual for the relevant transceiver.

Two methods of sending CAT commands are possible:

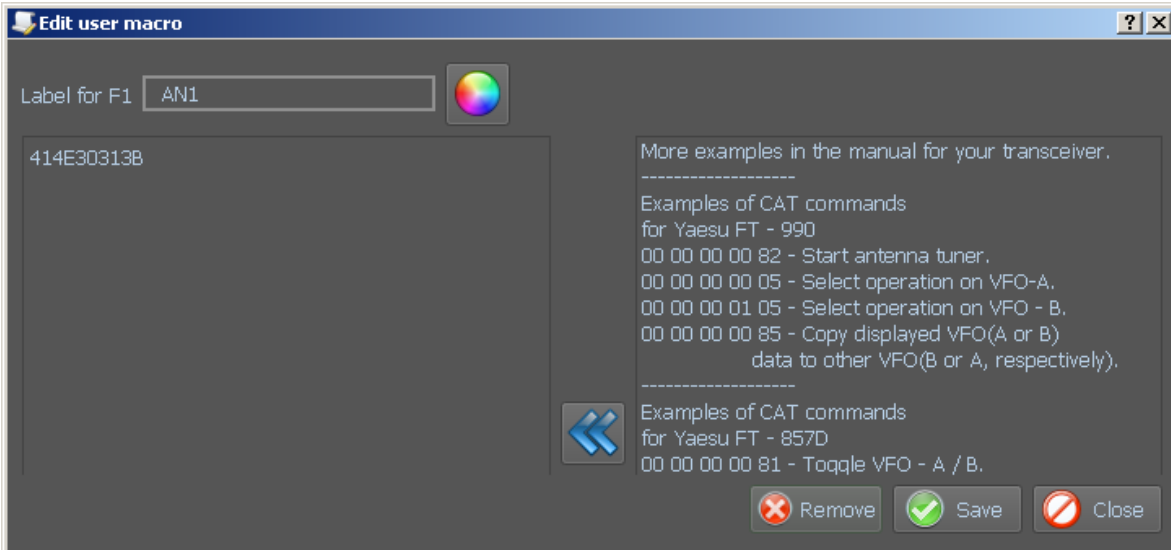
Using the macros <CATCMD:> or <CATCMDHEX:>

Using the CAT command storage area below.

Left click brings up a Control window.



This brings up a Macro edit window.



At present only hex commands can be used. The example *414E30313B* translates to *AN01*;. This is the command that switches to Antenna 1 on an FTdx3000. So any transceiver that uses Alpha/Numeric characters for CAT control can be controlled from Macros here. It is just time consuming to translate them.



The example shows three Macros.

Left click on a Macro name causes execution.

Any CAT commands entered here are saved in the CAT settings file.

## Transceiver Mode Switching

These controls select the mode your transceiver is in. **MixW4 software will not change mode.**



- LSB - selects LSB modulation mode
- USB - selects USB modulation mode
- CW - selects CW mode. Only if using Cat interface
- AM - selects AM modulation mode
- FM - selects FM modulation mode
- RTTY - selects RTTY mode. Use with FSK operation.
- PKT - selects Data or Digital mode.

### PKT to Data or Digital mode.

The PKT (Packet) control is the control that switches your transceiver into AFSK digital data transfer for transmission mode.

What happens in the transceiver will be different between manufacturers and models (e.g. the display may show Data USB on one type of transceiver but Dig(ital) on another). The transceiver may also need internal menu changes for selecting the data input port, method of activating transmit etc.

You must consult your transceiver manual to decide which settings are the correct ones for the mode you wish to work in. Not all modes are available in all transceivers

For example: You may wish to work in Data USB. Just pressing the USB control will put your transceiver in USB mode which may mean your data input is through the microphone input although MixW is sending it through the data input port.

You may find multiple clicks on the CW or RTTY mode buttons will change your transceiver from LSB to USB. Multiple clicks on the PKT button may switch between LSB, USB and FM.

## Waterfall Display

The Waterfall display, as manipulated by the Main Menu Show/Hide view of the Waterfall, consists of the following components:



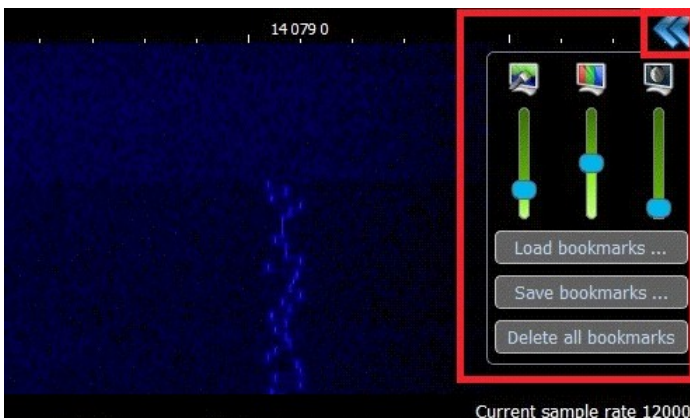
1. Show/Hide [KiwiSDR](#) Waterfall.
2. Toggle between RF or Audio frequency on waterfall display.
3. Cat Configuration in use (set up in CAT settings).
4. Select VFO to use (frequency shown in CAT display).
5. [Select Sound device](#).
6. Waterfall size adjust.
7. Waterfall number.
8. Dock/Undock for Waterfall resizing and repositioning.
9. Close Waterfall. Also closes the Mode display.
10. Waterfall
11. Right click displays [Show/Hide views](#) menu.



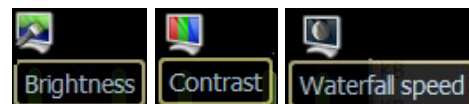
By clicking the left facing double arrow icon the waterfall size is increased. The double arrow now changes to right facing. Click this and the waterfall shrinks.

## Waterfall

The brightness, contrast and speed of the waterfall can be adjusted and Bookmark housekeeping may be carried out by left clicking the two left arrow heads in the top right corner of the waterfall and using the slider controls.

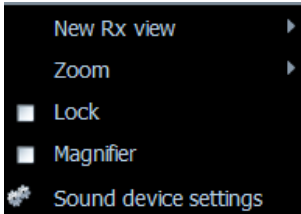


By hovering over the small icons at the top of the vertical sliders the function may be found.



Bookmarks maybe saved or loaded from files. These files are saved in the `{Data_root}\Data` folder of type `.text` (.txt).

## Waterfall Menu



A multichoice menu is available by placing the cursor in the waterfall area and right clicking.

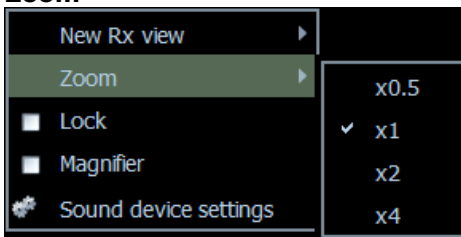
### New Rx view.



Select the mode for any additional signals you wish to monitor.

A new receive window will be opened.

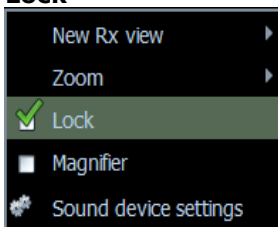
### Zoom



Select Zoom in the popup menu and set the value convenient for you.

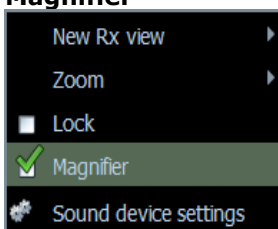
Use Zoom to assist in signal fine tuning.

### Lock



Lock is not yet implemented.

### Magnifier

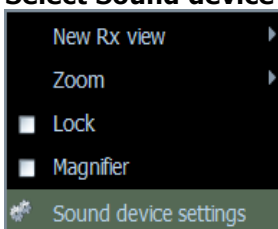


Magnifier opens a new Magnifier window.

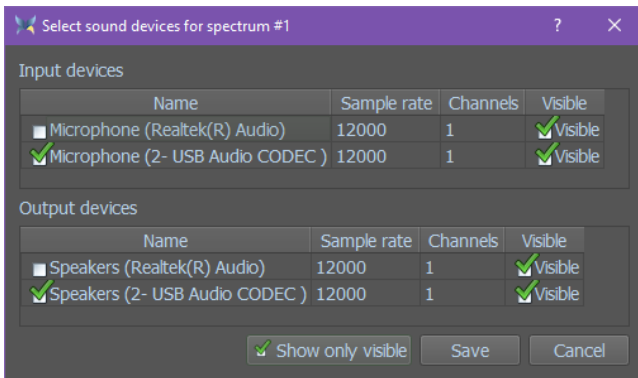
Resize this window to match your requirements. This window displays a magnified part of the waterfall display.

Use it to assist in fine tuning signals.

### Select Sound device

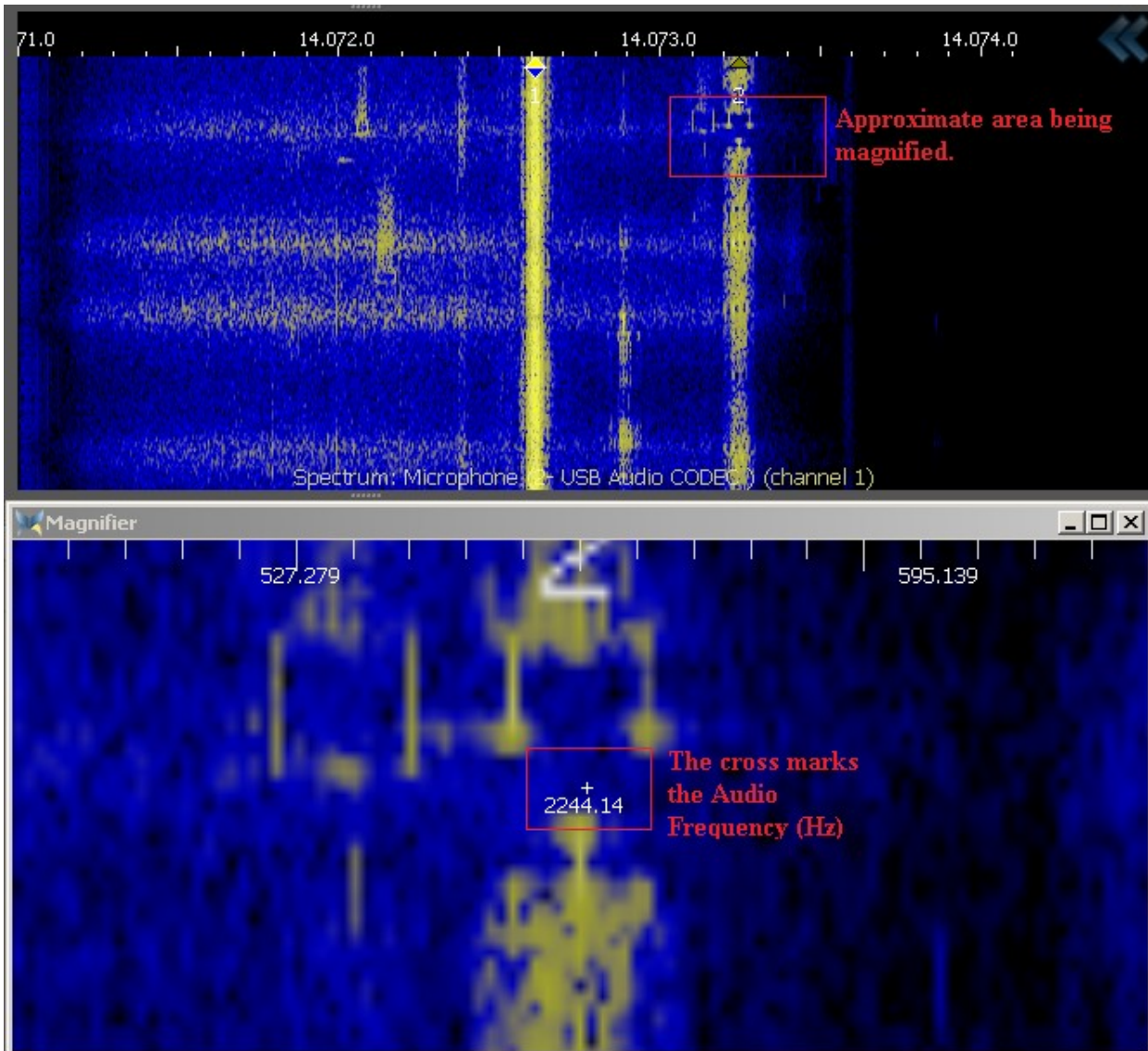


Displays the sound devices availability window.



Select the devices to use.

### Waterfall display with a Magnifier window



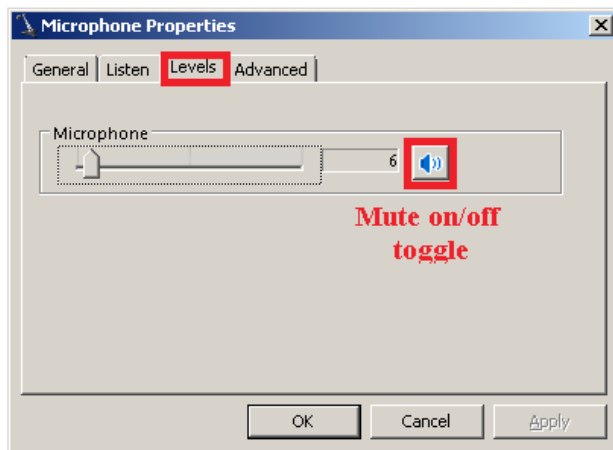
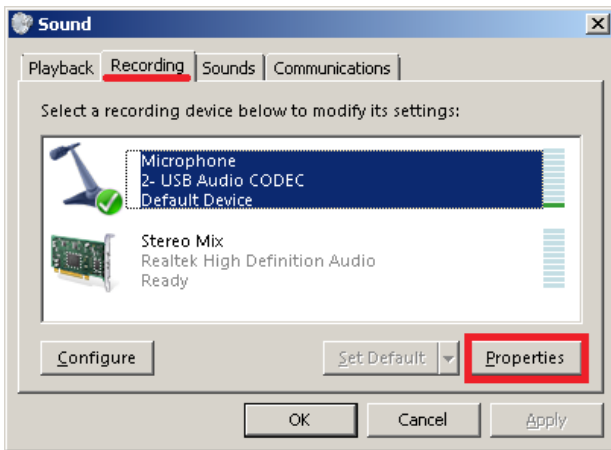
The area of the waterfall magnified depends on the size of the Magnifier window.

To select an area to magnify position the cursor in the waterfall. An area around the waterfall cursor will appear in the Magnifier window. As you slowly move the cursor in the waterfall you will see the data in the Magnifier window changing accordingly. Do not click the mouse unless you want to reposition the decoded signal of the selected Rx window.

**Patience and time are needed to make full use of this tool.**

### Setting Audio RX Levels:

Select the Recording controls by either using Control Panel/Settings and selecting Sound or right clicking on the Speaker icon in the system tray and selecting Recording devices.



For these adjustments it is convenient to arrange your MixW window and your audio mixer control so that you can easily see both windows and switch between the two. Set your transceiver's volume to a comfortable listening level. If you are using a transceiver to PC USB connection the audio level through this connection may be controlled from the RF volume or a separate transceiver menu selection.

### Consult your transceiver manual

Depending on your set up, you will be adjusting the Mic or Line-in controls. The best way to set these levels is to roughly tune in digital mode activity with your transceiver, and then click on the strongest signal in the waterfall display to direct MixW to that QSO. If MixW does not lock onto the signal right away you can then fine-tune it with your transceiver, or by clicking on the signal in the waterfall display again.

You may also need to balance the [Waterfall](#) brightness and contrast levels for a more comfortable view.

Adjust the input level on the Mic or line inputs until the background shows a dark blue colour and the actual signals (or strong noise) are a light yellow colour. Strong signals on the tuning display will be orange to red. It's very important not to overdrive your soundcard inputs. Overdriving these inputs will severely degrade your copy. Adjusting for the minimum record levels, while still providing a good display is the best starting point. It may be necessary to attenuate the signal between the transceiver and sound card, especially if you're using the Mic input of your soundcard. This can be done with a simple voltage divider circuit.

If you don't see any receive activity on MixW's displays at all, make sure that your Mic or line-in control is not muted and/or that the input you are using is selected. These options will vary depending on your soundcard drivers. Also double-check all your connections. It's also possible you're overdriving your soundcard and will need to attenuate the input signal.

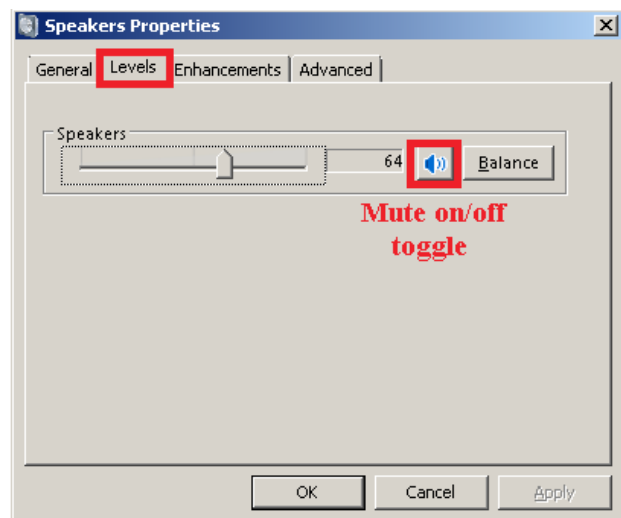
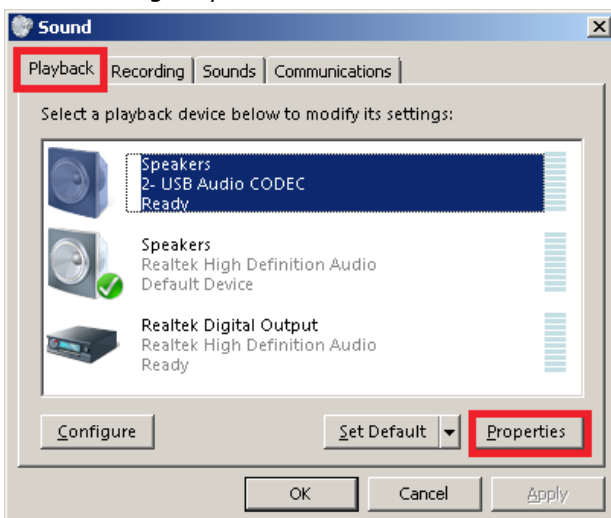
After these receive adjustments are optimized, go ahead and try to copy some QSOs to get a feel for the proper levels.

## Setting Audio TX Levels:

To transmit digital signals, you need to connect the sound card output (often through an isolation transformer or 100:1 attenuator) to the transmitter microphone, AFSK, or audio input.

Connect your sound interface and your transceiver antenna to a dummy load. You can now set the audio output level of your PC soundcard to match your transceiver's input circuit.

**It is extremely important to match your sound output levels.** Display the Windows Playback control by either using Control Panel/Settings and selecting Sound or right clicking on the Speaker icon in the system tray and selecting Playback devices.



These audio output adjustments are best made with your transceiver connected to a **dummy load**. This eliminates QRM as well as wear and tear on your equipment. Set your transceiver MIC gain control (if you are using mike input) slightly above its minimum setting and make sure your rig's VU meter (or indicator) is set to monitor "ALC". Your VOX threshold setting (if you're using VOX) should be adjusted as you normally have it for



your other modes. Set the VOX delay to LONG to prevent the possibility of dropouts. VOX must be on if you plan to trigger your TX/RX function with it. If you're not using VOX or an optional PTT circuit you can do these tests by manually engaging transmit on the rig when you tell MixW to transmit.

**NOTE:** MixW will not enter the transmit mode until you have configured your personal data information.

It is best to have MixW active in one window and the Volume Control mixer in a second window. For now slide the Windows Volume Control to a minimum (all the way down) setting.

First select BPSK31 mode. Display the TX view and click on *Send* in the TX status bar to put MixW into transmit. The *Send* changes to *Stop* and MixW will transmit a BPSK31 idle signal. To toggle back to the receive mode click the *Stop* box in the TX status bar. **Caution: Do not transmit for long periods while making these adjustments.** If you find that your adjustments take a while, let your rig rest in the receive mode for a while in between adjustment attempts.

**The adjustments.** Slowly raise the Volume control fader on the mixer while watching the ALC meter. As soon as you see a reading on the ALC meter, back the Volume control slider off until the ALC is at (or slightly below) zero. **It is VERY important that you have NO ALC reading.** Now check the reading on your power meter. It will probably be about 50% of your maximum power. Remember that most of the digital modes run a 100% (constant) key down (duty) cycle. Many rigs cannot sustain 100% power for very long. Depending on the mode you are using you may want to reduce the power output of your transmitter even further than the zero ALC reading.

If you are using VOX transmit switching and the VOX has not engaged by the time your Volume is set at mid way up the slider scale, then raise your rig's Mic gain slightly and try again. If VOX does not seem to kick in at low enough audio level, you may want to set the levels by manually setting the rig into transmit, then adjusting the sliders to optimize your audio signal (again you should just see your ALC indicator moving, and then back it off to zero), then reset your VOX circuit to trip at that level of input.

The optimal setting when using an interface which has no attenuation, will usually have your soundcard output (Volume and Wave Control settings) very low, and your Mic gain at a little lower than your norm for SSB operations. If you find that you are unable to control the audio using these controls in reasonable ranges, you very likely need to add attenuation between the soundcard output and the rig's Mic input. You can also try using the audio input of your accessory jack (if your rig is so equipped). This may avoid your Mic pre-amp circuit and be a better choice for signal matching.

Once you've optimized these settings make a note of the positions of your rig controls as well as the Windows Volume and Recording mixer positions.

A number of additional soundcards are available that can be added to the control PC internal sockets or connected via USB or FireWire ports. Using an additional card for digital operation means the PC internal soundcard does not need to be adjusted and a number of external soundcards have level controls available for ease of adjustment.

**Note:** The ALC reading may vary between different bands. If the ALC value changes (in particular if the ALC level has increased) as a new band is selected the soundcard output level must be adjusted to reduce the ALC reading to zero or below.

## Fonts and Colours.

### Fonts

The Tx/Rx windows fonts may be set by the [Rx Window](#). Only one font maybe selected for all modes that use the RX/TX window except Hellschreiber.

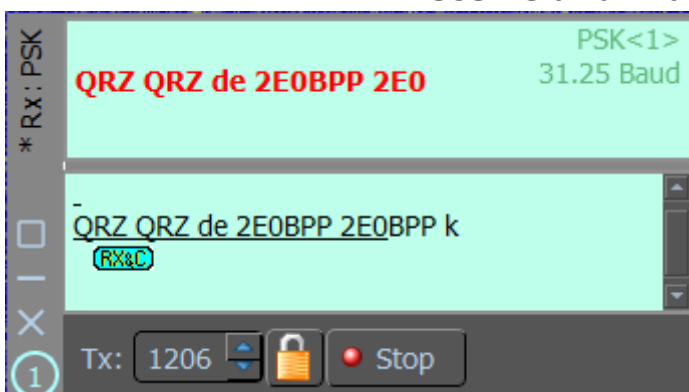
For [Hellschreiber](#) mode up to 4 fonts may be selected by using the Hellshreiber Mode settings dialogue.

### Text Colours

Set the text colours using the Setting-Config dialog menu [Text settings](#).

## Operating

### Receive and Transmit Windows



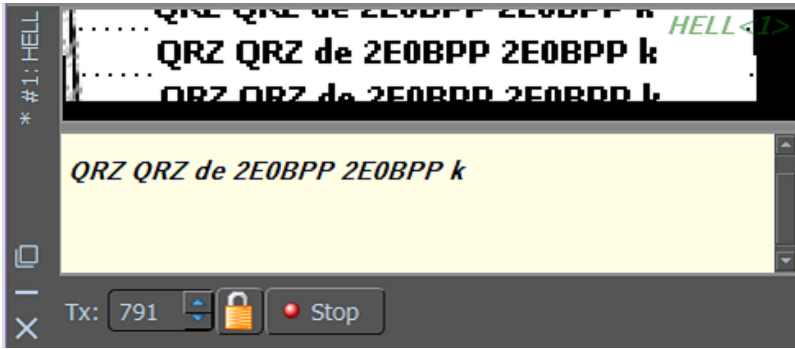
Receive window. Right click in the window to bring up the [Receive Window Menu](#).

The same font is used in both Receive and Transmit windows apart from Hell mode.

Transmit window. Right click in the window to bring up the [Transmit Window Menu](#)

The font colours are selected from the [Text settings](#) menu.

Transmit controls bar.



A choice of up to 4 transmit fonts are available in Hell mode. The receive font is as selected by the station you are receiving.

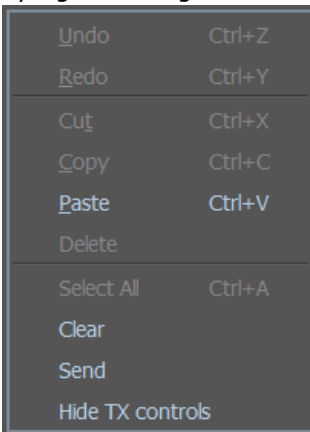
The transmit window font is as selected for all modes.

A Receive Mode Status Bar is located at the bottom of the main MixW4 window.

A Transmit Controls bar is located below the transmit window.

### Transmit Window Menu

By right clicking the mouse in the TX Window the following menu is displayed.

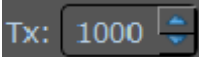


The menu items from **Copy** to **Clear** are standard windows text edit controls.

**Send/Stop** has the same effect as the Send/Stop button below.

**Hide TX controls** closes the transmit window.

### Transmit Controls



Transmit audio frequency



Transmit lock/unlock indicator and toggle control.

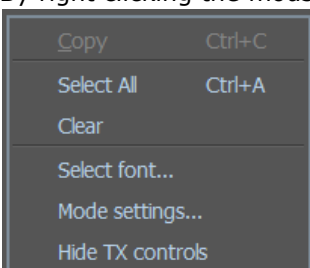


Toggles the transceiver between Tx and Rx.

The button changes from Start to Stop when MixW is transmitting.

### Receive Window Menu

By right clicking the mouse in the RX Window the following menu is displayed.

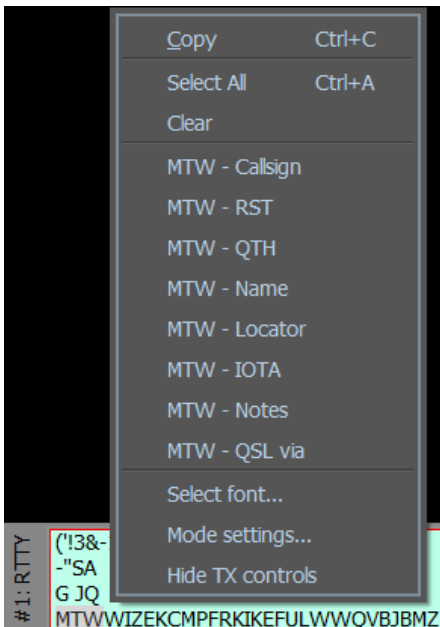


The menu items from **Copy** to **Clear** are standard windows text edit controls.

**Select font...** Opens a Font selection dialogue. The selected font is for the RX and TX windows. Font colours are selected through the [Text settings](#) menu.

**Mode settings...** Opens the Current MixW4 Mode settings window.

**Hide TX controls** A toggle control to show or hide the Transmit window.



If text is highlighted in the RX window the above menu becomes modified to this one.

The menu items **Copy**  
**Select All**  
**Clear**  
**Select font**  
**Mode settings**

**Hide TX controls** are the same as the menu above.

The other controls allow highlighted text to be copied to the named field of the [Input line](#).

## Receive Mode Status Bar

A Status Bar for the current mode is found at the bottom of the main MixW4 window to the left of the Main Menu selection bar.

This Status Bar has fields common to all modes and fields specific to the mode in use. Each mode's unique fields are described in the mode description.

The PSK mode Status Bar is shown below. Not all modes use all the fixed fields which are [highlighted](#) below.



### 1. [Message area](#).

Mainly used to display Auto CQ timer information.

A number of other messages may also appear here:

Host not found	Kiwi server not found.
Brightness 158	Waterfall brightness level.
Contrast 83	Waterfall contrast level.
Waterfall speed 27	Waterfall speed.

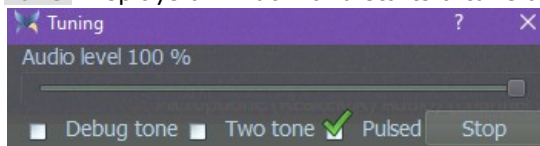
The waterfall values can be either from the RX waterfall or the KiwiSDR waterfall. It depends which waterfall you are adjusting the settings for.

### 2. [Mode selection drop down menu](#).

### 3. [Display the Mode settings window](#).

### 4. [Clear the RX window](#).

### 5. [Tune](#). Displays a window and starts a tune audio tone.



Use the slider to adjust the audio level (FT4 and FT8 only).

Select the type of tone to use.

Click Stop to cancel the operation.

### 6. [Display/Hide the Transmit window](#). Any data in this window is not deleted when the window is hidden.

### 7. [Save 40 seconds of audio history](#). Right click to browse files.

### 8. [Rx centre frequency](#).

### 9. [Lock the Rx freq](#). A red pin shows above the Rx cursor in the Waterfall.

### 10. [Switch Snap on or off](#).

### 11. [Display and Select the PSK Baud rate](#).

## Digital Mode Signal Reception and Transmission

Reception and transmission of digital mode signals can be split into two parts. Common requirements for all the different operating modes and mode specific requirements.

This section covers the common requirements for digital mode reception and transmission. Any special requirements for a specific mode will be included in that mode's section.

### MixW4 Mode selection.

To select the mode you want or to change modes you can either;

Use the [Rx Mode Status Bar](#) menu selection

or

Use the <MODE:> and/or <BAUDRATE:>, <SET TONES:> and <SET BW:> macros as required.

### **Tuning.**

The transceiver tuning is used to locate signals of the selected mode in the selected band. Fine tuning will be done by using the waterfall cursor to line up on the signal. Minor adjustments maybe made by using the Mouse wheel. Use the MixW General settings [Mouse wheel](#) configuration settings to set for your choice of stepping values.

Once the signal has been selected a decode should start to appear in the receive window. Further micro adjustments maybe achieved by creating a pair of macros.

Either:

<FQ:+0.001>

<FQ:-0.001>

These macros adjust the transceiver tuning by +/-1Hz.

or:

<AUDIOFQ:+0.001>

<AUDIOFQ:-0.001>

These macros adjust the audio frequency by +/-1Hz.

The receive frequency may be locked by use of the *Fixed RX frequency* control in the Receive Mode Status Bar or the <LOCKRX> macro.

### **USB or LSB?**

The convention for digital mode working is USB. A number of modes can be operated in either USB or LSB and received in the opposite sideband. Historically with RTTY operated as an FSK signal mode it is common to find LSB signals.

MixW4 has an Invert control available which will reverse the signal being received. If a signal is being received but no sensible data is being displayed in the receive window reversing the setting of the Invert control may enable a decode.

### **Filters**

Currently MixW4 has no built in filtering. The only aids to assist with signal resolution are the [waterfall](#) Zoom and Magnification controls.

Modern transceivers with Digital Signal Processing (DSP) can provide very good signal filtering. Consult your transceiver manual to find the best filtering available for your needs.

MixW4 will most probably need to be configured to set your transceiver into the correct operating mode for the MixW4 mode you are operating in. See the sections on [Bandmap](#), [CAT Configuration](#) and [Transceiver Mode Switching](#).

By use of the CAT Macro commands <CATCMD:>, <CATCMDHEX:> or the [Cat Control](#) storage area you may be able to include CATCMD macros to select your choice of transceiver filters. Consult your transceiver manual or transceiver CAT programming manual.

### **Transmission**

Once the transceiver is tuned to a wanted signal or frequency, the required mode selected and you have entered your call in the [Personal details](#) set up page you are now ready to transmit.

Type data into the transmit window or use macros to enter regularly used data.

To put MixW into transmit either use the *Send* control under the transmit window (the control will change to *Stop* whilst MixW4 is transmitting) or use the <TX> macro. You may continue typing data into the transmit window whilst MixW4 is transmitting.

As data is transmitted it will be reflected in the receive window. The colour of this text can be changed to your personal choice by using the [Text settings](#) menu.

To stop transmission either use the *Stop* control under the transmit window, use the <RX> or <RXANDCLEAR> macros or press the *Escape* key which is an 'Emergency Stop' control. If you use the *Escape* key transmission will stop instantly possibly leaving unsend data in the TX Window. If the *Escape* key is pressed twice in quick succession data in the TX window will be erased.

You may find your digital QSOs 'wandering'. The receive signal is never on the same frequency as the previous transmission. To counteract this try Locking or Fixing your transmit signal. Either use the *Fixed TX frequency* control in the Transmit Mode Status Bar or the <LOCKTX> macro.

When transmitting, the waterfall will freeze and remain frozen until returning to Receive.

### **Multiple Windows**

With most of the digital modes, It is possible to open multiple windows and switch the active window (the one you will be sending from) between them.

## **Logging**

The MixW4 log is held in the file `{data_root}\multipan.db3`.

MixW4 has a number of methods of inputting and displaying QSO and other log data:

- Runtime QSO Input.

- Partially display the log using the Short Log.

- Editing or Adding a New QSO using Log Search.

- Inputting/updating QSOs using the Log Search import tools.

## Runtime QSO Input

Non-contest QSO input.

Call	Name	QTH	RST-S	RST-R	Notes			
			599	599				
Mode	Fq(Hz)	UTC	Locator	IOTA	QSL y/a		<b>Start Contest</b>	
BPSK31	14,071,662	20/06/2018 04:28						

### Input field selection

There are 4 methods of moving the cursor to different input fields:

Position the mouse pointer in the required field and left click.

Use the macro <CURSOR:n>. <CURSOR:1> selects the Call field.

Each field name has an underlined letter. Use the *ALT+letter* to go to the field.

Use the *TAB* key to step between fields.

### Tool icons



Display a menu selection allowing changes to be made to the displayed data input columns.



Save the current QSO data. This data will now be available for display in the Short Log and Log Search screens.



Clear the current QSO data.



Send a Spot to the Cluster.



Enter [Contest](#) mode.

## Short Log and QSO statistics

The Short Log and QSO statistics are displayed or hidden using the Main menu [Show/Hide views](#) QSO statistics toggle.

When first used the Short Log allows display of up to the last 26 QSOs.

Del.	Edt.	Date	Time	Freq.(Hz)	Mode	Call	RST-S	RST-R	Name
		07.06.2020	15:11:42	14,083,569	HELL	UR5XMM	599	599	
		07.06.2020	16:55:17	14,073,198	PSK63	RX3ASQ	599	599	Andrey
		07.06.2020	17:03:13	14,085,077	RTTY	UR7EC	599	599	Alexander
		07.06.2020	17:16:14	14,088,673	OLIVIA	UR5TL	599	599	Vladimir
		07.06.2020	17:25:25	14,084,694	OLIVIA	ER1PB	599	599	

By using the control the number of QSOs that can be displayed can be increased/decreased by multiples of 25. Use the slider control to the right of the display to move the displayed selection.

To edit a QSO select the entry and click on the *Edt* field. This will display the Edit QSO window.

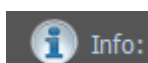
### QSO Statistics



This display shows the modes/bands worked for the country displayed next to the Info icon.

### QSO Statistics Tool Bar Icons and Information.

Not all the information and icons are available at all times.



Displays the information below if the Settings/Settings *Legend* of the Short log is ticked.

QSO:	Before	New	New Mult	Not Allowed	New DCCC	Unknown state
Legend:						

The colours of the boxes are controlled from the *Main menu-Settings-Text settings - QSO state*.

Distance:5295.59, Bearing:288°, 5296 km  
(3291 miles), Country:United States,  
Info:K2

Station location information.



Show/Hide QSO statistics.



Reset filter.



Use the filter to display information.



Full log search for filter call.



Show a Settings menu for the Short log and Statistics display.



### Short Log Settings



Columns

Select the columns to display in the short log when in normal running mode.



Contest mode

Select the columns to display in the short log when in contest mode.



Bands

Select bands to display. Bands missing from the Band map are not available.



Modes

Select modes to be displayed in the short log. The modes available for selection are those found in the log. If the log is empty no modes will be available.



Settings

Select what data is to be displayed in the short log (Legend control is here).



Display

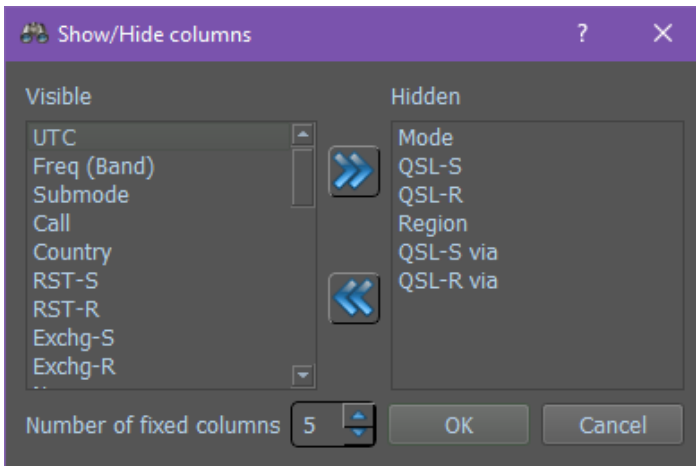
Select font and colours for the displays

## Log Search

UTC	Band	Submode	
2018-05-13 08:44:26	20m	BPSK125	K2
2018-05-13 08:42:41	20m	BPSK125	Vk
2018-04-26 20:29:21	80m	RTTY	M
2018-04-26 20:27:52	80m	RTTY	G
2018-04-26 20:26:19	80m	RTTY	G
2018-04-26 20:24:39	80m	RTTY	M
2018-04-26 20:23:59	80m	RTTY	M
2018-04-26 20:23:04	80m	RTTY	G
2018-04-26 20:19:59	80m	BPSK63	G
2018-04-26 20:17:07	80m	BPSK63	G

See [QSO edit](#) for information on QSO editing.

The  icon allows the selection of information displayed.



The fixed columns are always the left columns displayed.

Use the slider bar under the displayed log information to show the variable columns.

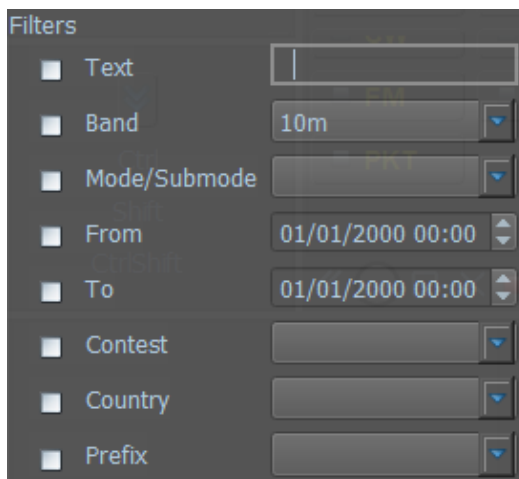
If you choose to hide one of the fixed columns the next column along will become fixed. To prevent this happening reduce the Number of fixed columns by 1.

**Note:** Not all the log contents can be displayed.

## Log Manipulation Controls.

By left clicking on a column name that column will be sorted alpha/numerically. A small upward or downward facing arrow is appended to the column name indicating if the sort is in ascending or descending order.

**Note:** Upper and Lower case letters are significant.



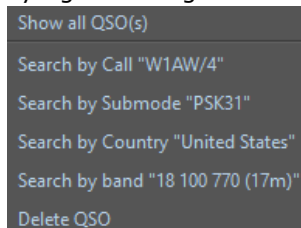
The filters allows selection of various search parameters. When a search is actioned the log column(s) searched have an asterisk (\*) appended to the column name.

Text searches the log for the text. Not all text patterns (eg IOTA Format) are supported yet.

The From and To parameters can be typed in or use the arrow controls.

The other filters are drop down menus that only carry settings found in your log.

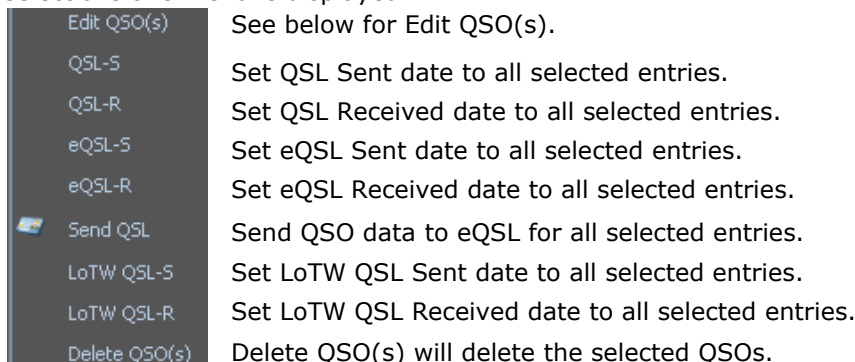
By right clicking on a single QSO a much more limited set of parameters are displayed.



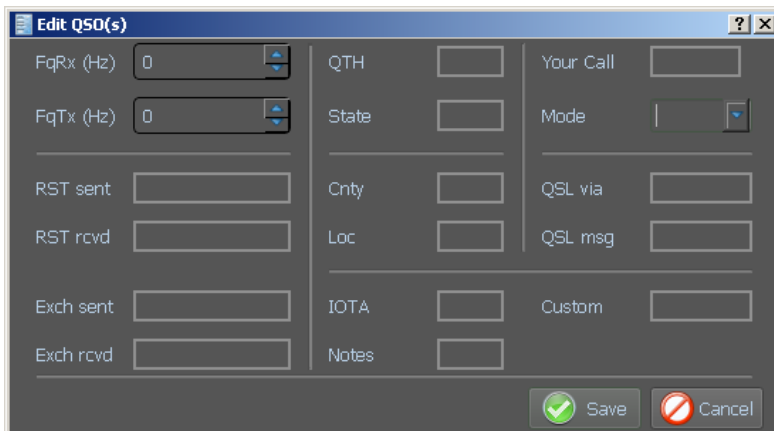
Using these controls may cause the main Filters parameters to be changed.

## Multiple QSO Actions

By selecting a number of QSOs (use the standard windows edit operations) then right clicking on these selections this menu is displayed:



By selecting Edit QSO(s) this window is displayed.



This will allow an update of the selected field(s) with the same data to all QSOs selected.

**> QSL**



Reading of your eQSL Inbox.

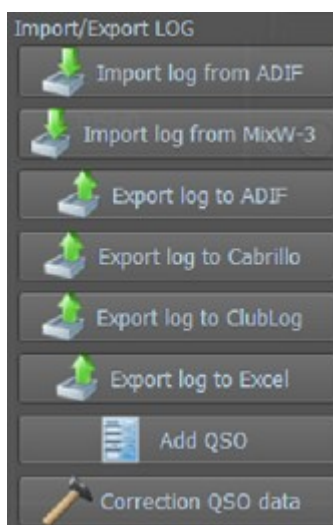
Sending selected QSOs to your eQSL Outbox.

Get records from your LoTW in box.

Send selected records to LoTW.

Send selected records to ClubLog

**> LOG tools**



[Import an ADIF file](#) to allow you to: Restore a deleted Log, Insert extra QSO records into the log or Update existing QSO records (eg add QSL received information).

[Import a log file in MixW2/3 format.](#)

[Export to an ADIF file](#) using the selected QSO records.

[Create a Cabrillo file](#) using the selected QSO records.

[Export to ClubLog](#) using the selected QSO records.

[Export to Excel](#) using the selected records.

[Add a QSO.](#)

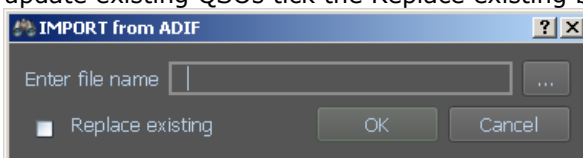
[Correction QSO data.](#)

### ADIF file import

By selecting this option a file selection and option window is opened.

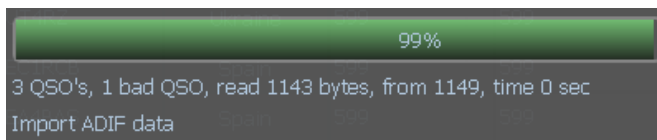
MixW4 expects to find the file in the *{program\_root}* folder. To use a file from any other location a full pathname should be specified.

If you are loading QSO information for the first time the Replace existing box should not be checked. To update existing QSOs tick the Replace existing box.



Click OK.





The import progress is now displayed. When the load is complete a summary of the activity is displayed.

An Import completed window is displayed that covers the summary window. You can safely move this window to see the summary.



The information on what actions have been performed using the import data is now displayed.

A file `{data_root}\bad_qso.adi` is always produced. If no errors have been detected this is a zero length file. Any ADIF lines in the file that have generated errors are written to this file. There maybe no error in a line. If a QSO Import has been executed and an attempt has been made to import a duplicate of a QSO already in the log this QSO information will be in the `bad_qso.adi` file.

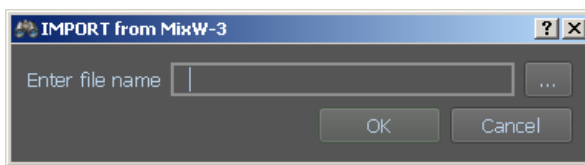
If a replacement run has been executed there maybe new QSOs in the log if not all the replacement criteria have been met. To identify if this has happened look at the Short Log QSO display.

### MixW-3 log import

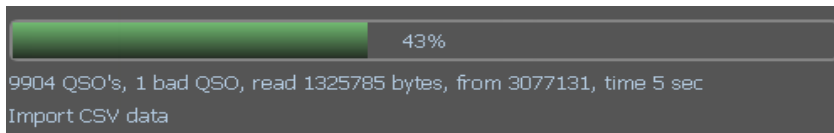
Although the title references MixW3 log files as there is no difference to the MixW2 log format either release log files may be selected.

By selecting this option a file selection and option window is opened.

MixW4 expects to find the file in the `MixW3 {program_data}` folder. To use a file from any other location a full pathname should be specified.

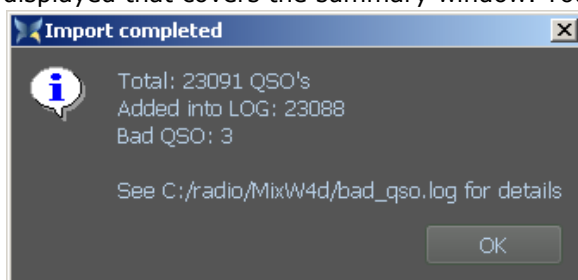


Click OK.



The import progress is now displayed.

When the load is complete a summary of the activity is displayed. An Import completed window is displayed that covers the summary window. You can safely move this window to see the summary.



The information on what actions have been performed using the import data is displayed.

A file `{data_root}\bad_qso.log` is always produced. If no errors have been detected this is a zero length file. Any log lines in the file that have generated errors are written to this file. There maybe no error in a line. If a QSO Import has been executed and an attempt has been made to import a duplicate of a QSO already in the log this QSO information will be in the `bad_qso.log` file.

### ADIF log export.

Before using this facility select the log records you wish to export. By default the whole log will be exported.

A file selection window will be displayed once this option is selected. By default the file will be created in the `{data_root}` folder. A full pathname must be supplied if any other file location is to be used. Click save and the following message box is displayed:



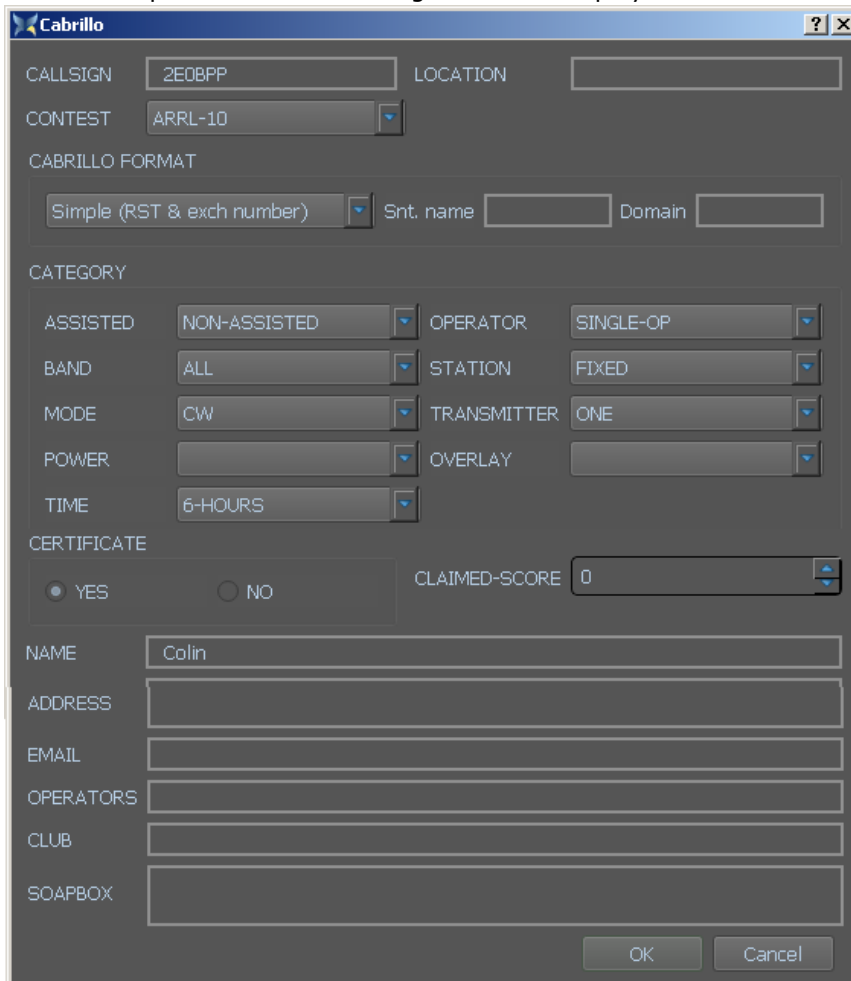
Click on Yes or type Y and the file will be created.

### Cabrillo file creation.

Before creating a Cabrillo file select the QSOs you wish to use. By default no QSOs selected causes all the QSOs to be copied.

Also make sure you have the contest rules available and make sure you know all the possible exchanges for this contest.

Select this option and the following window is displayed:



Fill in the relevant information for the contest you are creating this file for.

Click on OK and a file selection window is displayed.

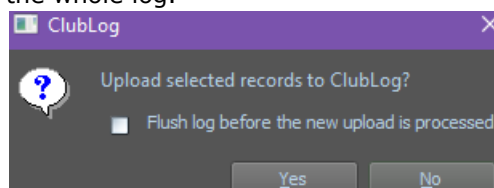
The default filename is *your call.cbr* and by default the Cabrillo file will be written to `{data_root}\Contests` folder. A full pathname must be specified if any other location is to be used. Click on Save and the file is now created.

Once the Cabrillo file is created check it for omissions and mistakes.

### Export to ClubLog

You must have a valid ClubLog membership, with the data entered in the [ClubLog](#) settings, before using this facility.

Select the log lines to be exported. If no log lines are selected you will be asked if you want to export the whole log.



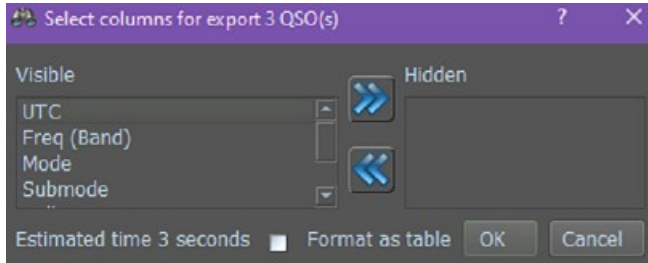
Consult ClubLog upload for use of the *Flush log* feature.

Finally click Yes to upload the records.

### Export to Excel

Microsoft Excel must be installed for this facility to work.

Select the log lines to be exported. If no lines are selected the whole log is automatically selected.



Move *Visible* data you do not want in the table to *Hidden* and data from *Hidden* to *Visible* if you now want to display it.

Tick *Format as table/i>* to create a table.

Finally click *OK* to create the file.

A warning will be displayed if *Excel* is not installed.

## Add/Edit a QSO

There are two types of QSO edit. A single QSO edit or [Multiple QSO edits](#).

A single QSO edit is achieved by double clicking on the QSO. Both Add a QSO and Edit QSO produce the same window layout, with different titles.

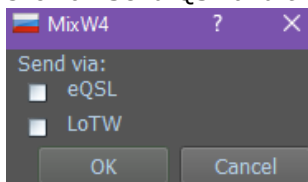


The Icon to the left of the title is the flag of the country.

The Edit QSO window displays the information copied from the log. All these fields maybe updated and the data saved. However not all the fields in the log are displayed.

## Send QSL

Click on Send QSL and this window appears.



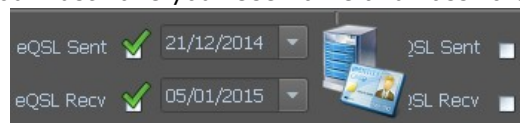
Select *eQSL* or *LoTW*


Providing you have set up your connection details in the [QSL settings](#) menu the appropriate QSO will be sent.

## eQSL card from eQSL.cc

To get an eQSL card image you must have your Username and Password set up in the [eQSL settings](#).

If an eQSL has been received an icon is inserted to the right of the eQSL entries.



Hover the cursor over this icon and a further icon  is superimposed.


Click on this icon and an attempt is made to copy this eQSL card image to MixW4.

There is no separate indication of failure. The original eQSL received icon remains.

If successful the icon changes to an icon image of the received eQSL card. The file, suffixed PNG, received from eQSL is stored in the `{data_root}` ecards folder. The file name will not identify who the eQSL image is from. This filename is stored with the QSO information in the multipan.db3 database. This information is not displayed with other QSO information.

This saved image, despite having a .PNG suffix cannot be displayed using any picture display software (Paint, Paint3d etc) except MixW4 displays it correctly.



If the mouse is hovered over the received eQSL icon an  icon is superimposed on it. Left click on this icon and the received card image is displayed full size.



**Print** prints the eQSL.

**SaveAs** will save the eQSL in proper PNG format and enable a useable name for the file. A file selection box will be displayed.

**Close** ends the eQSL display.

## Log Correction

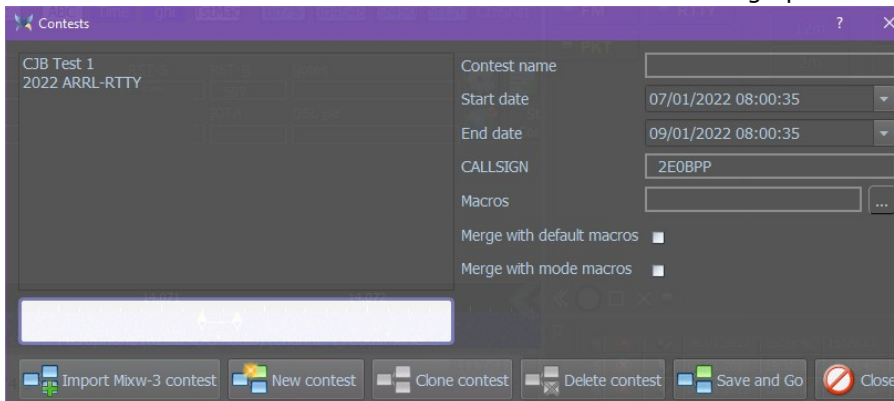
Allow correction of selected station location information from the data in the latest cty.dat file.

## Contesting

MixW offers extensive support for contest operation, including special Macros, new keyboard keys for direct macro activation as well as a different QSO input window. It can be configured for specific contests and these settings can be stored for future use.



To enter contest mode click on the **Start Contest** icon. This will bring up the Contests window.



The left side contains a list of saved contests, including those imported from MixW3.

To activate a previously saved contest left click on that contest name.

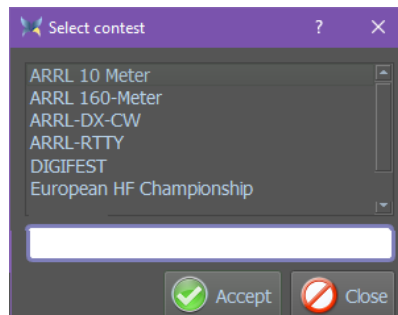
If necessary update the contest parameters on the right side of the window.

Finally click Save and Go. You will now enter contest mode.

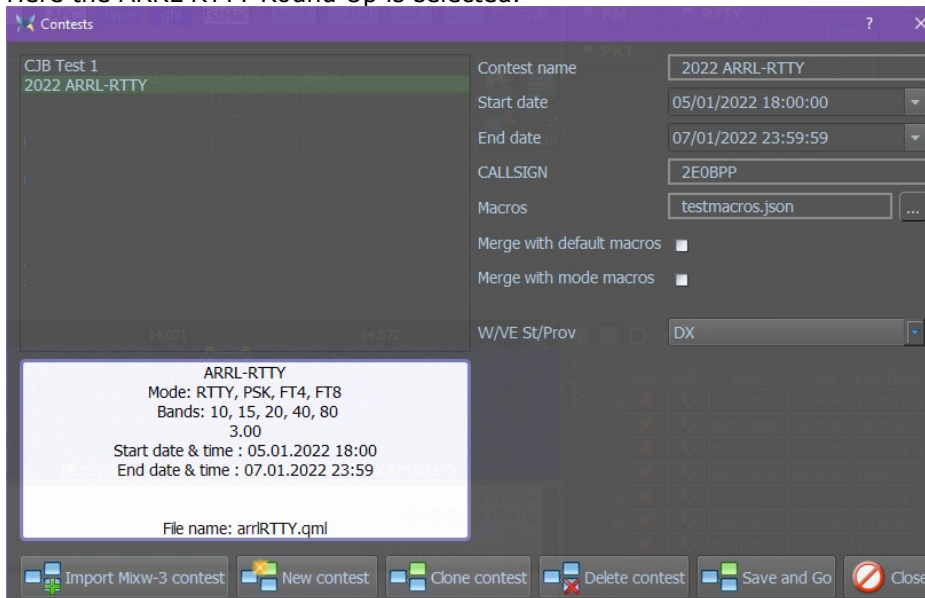
### Create a new contest

Click on New contest and a list of available contests will be displayed in a new window.

Highlight a contest to be activated and click Accept.



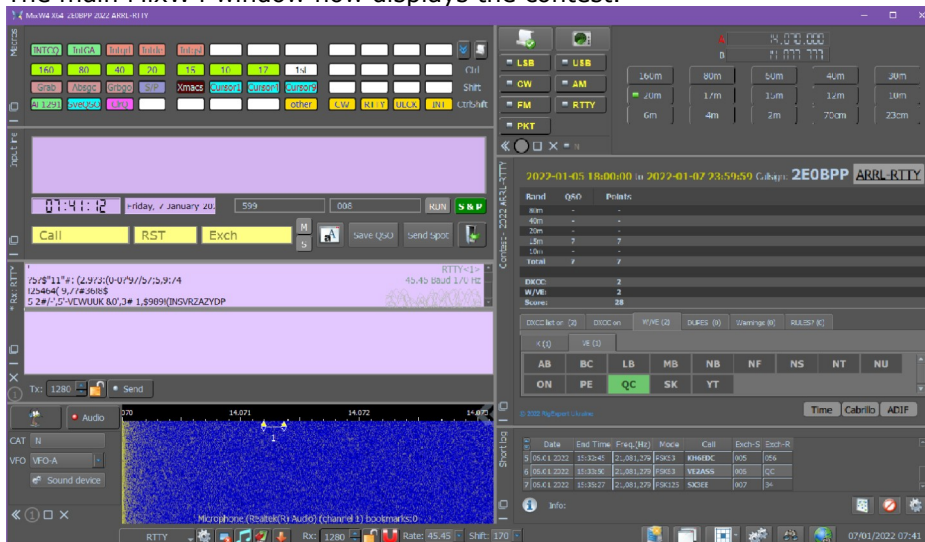
Here the ARRL RTTY Round Up is selected.



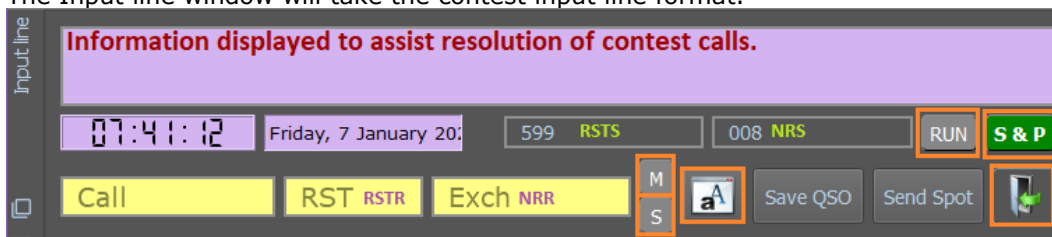
Make any changes to the contest details like Start/End Date and Time, Macros filename e.t.c.

Click on Save and Go. At this point a file, *contest.json*, is created/updated in *{Data\_root}\Contests* with this contest information.

The main MixW4 window now displays the contest.



The Input line window will take the contest input line format.



**RUN** Control selects Run mode. **S & P** Control selects Search and Pounce mode.

**M** Blank NRR entry save control. Causes to save, when set, a contest QSO with a blank NRR using the *Intelligent macros*, activated by the Carriage Return key or Space bar.

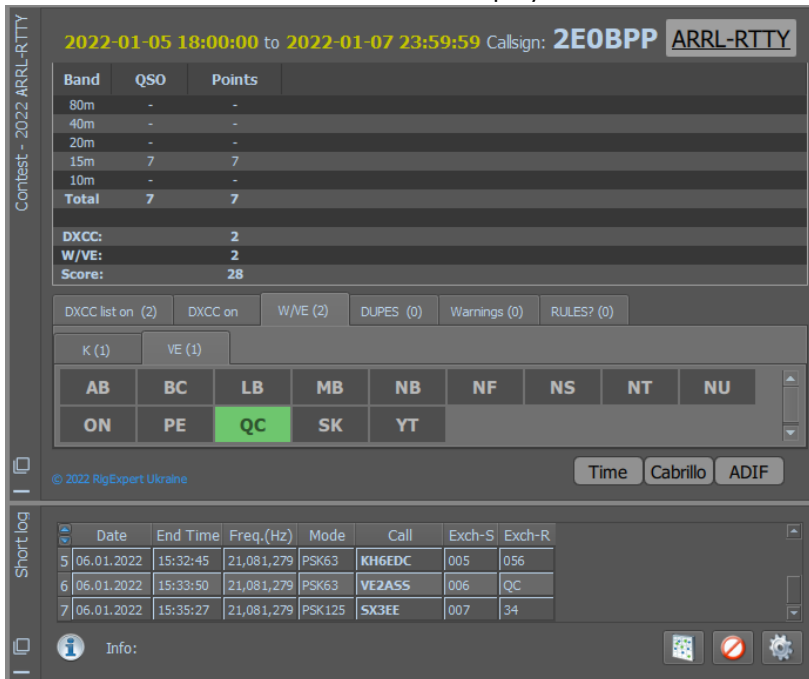
**Note: If this control is on before a valid NRR is received the QSO maybe saved with no NRR saved.**

**S** Allow NRR manual space entry control. When set allows manual entry of NRR that contains a *Space* character. When the QSO is to be saved a double Carriage Return key or Space bar action is required.

**a** Select display font and colours.

**Exit** Exit Contest.

A new Contest information window is displayed.



Click on the contest title to display the contest rules.

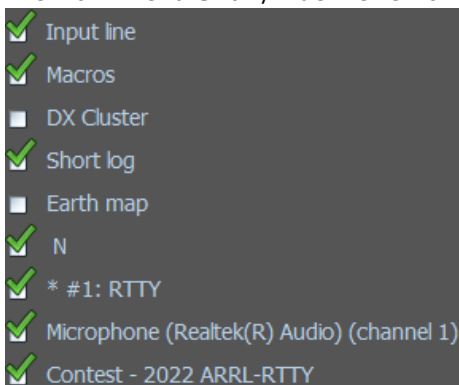
This area displays the scores achieved so far.

This area displays data for multipliers received/needed and invalid contest QSOs.

The **Time** control displays a window showing the contest performance. The **Cabrillo** control shows a window to assist in creating a Cabrillo file. The **ADIF** control generates an ADIF file of the contest QSOs.

The Short log acts as the contest log.

The Main menu Show/Hide views now shows this contest.

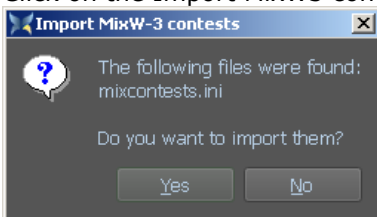


Show or Hide the Input line and/or the Contest window by ticking/unticking the relevant check box.

Hiding the Contest exits contest mode.


## Import Contests from MixW3

Click on the Import MixW3 control.



Click on Yes.

**Note: MixW3 contests do not work under MixW4 at present**

To exit Contest mode click on the  icon to the bottom right of the Input line.

## Contest Macros

A filename box *Macros* is one of the details requested before starting the contest. If this is the first time the contest has been entered a default filename is offered.

There are 3 possible options that can be entered in this filename box:

1. Use the default filename.  
If this file does not exist it will be created with 48 blank macro entries and the contents of file `{data_root}\Macros\smart-input.json`. These extra macros use the Gray keys and `<INT>` macro (see below). This file is saved to the `{data_root}\Contests\Macros` folder.
2. Use the browse control (to the right of the filename box) to use a previously created set of contest macros.
3. Delete the current contents and leave the filename blank.

Other options offered are to merge the current default macros and current mode macros with the contest macros.

Three new keyboard controls are introduced for contest mode macro control:

1. Gray+
2. Gray-
3. Gray\*

Each of these key names can be used in a contest macro file and assigned a function. These keys are preset in the default macro file but can be changed by the contester as required.

There are 7 macros to switch between RUN or SEARCH AND POUNCE mode:

<SP1>	sets search and pounce mode on.
<SP0>	sets search and pounce mode off (run mode on).
<S/P>	toggles between search and pounce and run mode.
<SP:0>	Sets search and pounce mode off (run mode on).
<SP:1>	Sets search and pounce mode on.
<OnSP0>	Sets search and pounce mode off (run mode on).
<OnSP1>	Sets search and pounce mode on.

Other macros used during contest operation:

<OnCR>	Preset to <INT> in the contest macros. This macro is called when the Return key or Space bar are pressed with the Cursor in the CALL, RST or NRR fields.
<ABSGRABCALL>	Get the next Call from the input data. Overwrites any entry currently in the Call field.
<GRABCALL>	Get the next Call from the input data. Only gets call if the Call field is empty.
<ACALL>	See <a href="#">Use of &lt;ACALL&gt; macro</a>
<CCALL>	See <a href="#">Use of &lt;CCALL&gt; macro</a>
<NRS>	Insert Exchange to send
<NRR>	Insert Exchange received
<PREVCALL>	Insert Previous Call
<PREVRSTS>	Insert Previous sent RST
<PREVRSTR>	Insert Previous received RST
<PREVNRS>	Insert Previous Exchange to send
<PREVNRR>	Insert Previous Exchange received

The following 3 macros require support from the contest control software. They may not work with all contests.

<CONTESTCMD:text_json>	JSON command in contest mode
<CONTESTCMDF>	Choose JSON file in contest mode
<CONTESTCMDF:file_name>	Open JSON file in contest mode

### <INT> macro

In Contest mode there are several macros which are dependent on each other and the contents of certain fields in the contest log.

These macro sequences are controlled by the <INT> (Intellegent) macro. This macro is called by the OnCR macro whilst MixW4 is in Contest mode or a single macro key can be programmed with the <INT> macro enabling a 1 key control of a complete contest QSO in Search and Pounce mode or a 2 key control in Run mode.

### Search and Pounce Mode macros

Call	Exchange .....	Output.....	Macro to Edit
------	----------------	-------------	---------------

-empty-	-empty-	grabcall de mycall k	INTQRL
NEWCALL	-empty-	de mycall	INTDE
WKDCALL	-empty-	nothing	none
NEWCALL	exchange	QSL UR 599 001 <SAVEQSO> See <a href="#">contest input</a> M & S controls.	INTQSL

### Run Mode macros

Call	Exchange	Output.....	Macro to Edit
-empty-	-empty-	CQ TEST DE mycall	INTCQ
NEWCALL	-empty-	newcall GA 599 001	INTGA
WKDCALL	-empty-	newcall QSO b4 QRZ	INTQB4
NEWCALL	exchange	QSL 73 QRZ de mycall <SAVEQSO> See <a href="#">contest input</a> M & S controls.	INTQRZ

### Use of <ACALL> & <CCALL> macros

The <CALL> macro reads the Call field from the Input line immediately after it has been activated, usually embedded in another macro. This works as long as the call is complete eg the <GRABCALL> macro has been used or the call has been obtained from the receive window by positioning the mouse cursor in the call and double left clicking.

Some modes cannot reliably use the above method, Hellschreiber or CW for example. The call has to be input into the Call field by manually typing it in. In a contest time can be lost in replying as the call has not been completely entered. To overcome this problem two macros have been created.

The <ACALL> & <CCALL> macros have a similar function.

Both allow the updating of a call in the call field after MixW4 has gone to Transmit mode. However the final output is different for each macro.

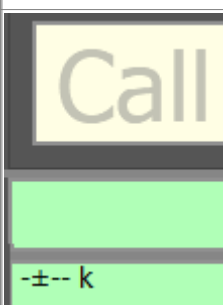
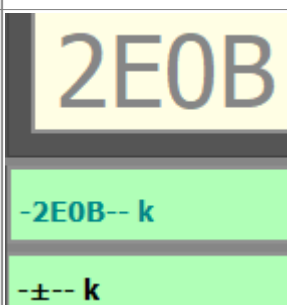
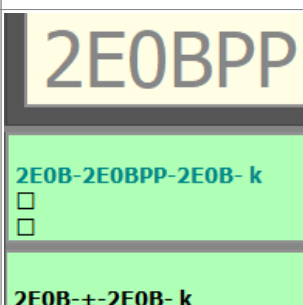
#### The <ACALL> macro

This macro can be substituted once in a data transmission string for the <CALL> macro anywhere it is used. It will always read and output the current contents of the Input line Call field *as it is executed* from the transmit window.

Example of actions.

An artificial macro sequence used to demonstrate the actions:

<CRLF><CALL>-<ACALL>-<CALL>- k<RX>

Macro called with no call in the Call field.	TX window activated using the macro then partial call inserted.	TX window is activated using the macro with a partial call in the Call field. The call is now completed.
		
TX Window not activated as there is no call to output.	The <CALL> macros output no data but the <ACALL> macro outputs the partial call.	The <CALL> macros output the partial call and the <ACALL> macro outputs the complete call.

Note the ±(plus-or-minus symbol) used to indicate the position of the <ACALL> macro in the transmit data stream.

#### <CCALL> macro.

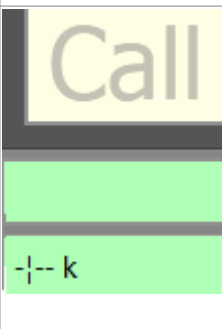
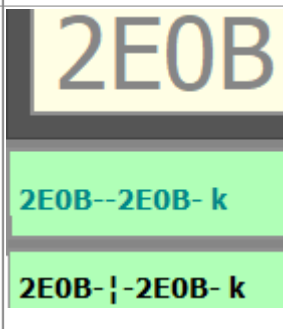
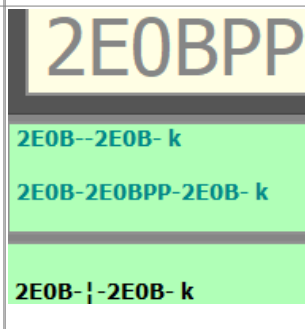
This macro can be substituted for the <CALL> macro but it will not output any data unless the macro detects, *as it is executed*, the Call field of the Input line has been changed.



Example of actions.

An artificial macro sequence used to demonstrate the actions:

<CRLF><CALL>-<CCALL>-<CALL>- k<RX>

Macro called with no call in the Call field.	A partial call inserted then TX window activated using the macro.	TX window is activated using the macro with a partial call in the Call field. The call is now completed.
		
TX Window not activated as there is no call to output.	The <CALL> macros output the partial call data but as there has been no change to the partial call since the macro was called the <CCALL> macro outputs no data.	The <CALL> macros output the partial call and the <CCALL> macro outputs the complete call as the changes were made after the macro was called.

Note the | (pipe symbol) used to indicate the position of the <CCALL> macro in the transmit data stream.

**Warning:** If both the <ACALL> & <CCALL> macros are included in the same macro sequence the results may be unpredictable.

**The contest facilities, apart from the Gray keys, <ACALL> & <CCALL> macros, can be used during normal running.**

## Digital Modes


- [Contesti](#)    [CW](#)    [FT4](#)    [FT8](#)  
[Hellschreiber](#)    [MFSK](#)    [Olivia](#)    [PSK](#)  
[RTTY](#)    [RTTYM](#)

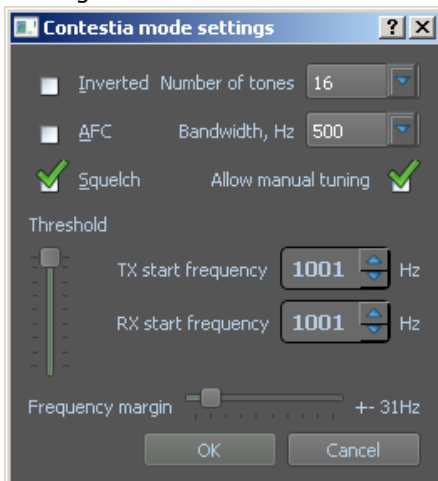
### Contesti

#### Contesti Introduction

Contesti (formerly known as Contestia) is a development from Olivia mode with reduced character set and robustness created by Nick Fedoseev (UT2UZ).

#### Contesti Operation

Contesti is a version of MFSK, and in MixW the operating procedures are the same as for MFSK with the exception of certain options which can be set in the Mode settings dialog box. Select Contesti mode and by clicking the  icon on the status bar you will see the following dialog box:



**Inverted** causes the signal to be inverted.

**Number of tones** selects from 8 values between 2 and 256

**AFC** assists tuning and tracking the Contesti signal.

**Bandwidth, Hz** selects from 5 values between 125 and 2000

**Squelch** and **Threshold** can be adjusted to your preferences.

**Allow manual tuning** is permanently enabled.

**Tx/Rx start frequencies** are the signal **low** frequency settings.

**Frequency margin** alters the frequency range signals are decoded.

The Contesti status bar allows the setting of the Tx/Rx centre frequency, number of tones and bandwidth.



Status bar unique settings:

- 1 The Tx/Rx **Centre** frequency.
- 2 Number of tones.
- 3 Bandwidth (Hz).

The signals seen on the waterfall are practically identical to Olivia and RTTYM signals. As with all digital modes, after a little experience the user will be able to identify the various formats visually in the waterfall.

### **Finding and Tuning Contesti Signals.**

Contesti under MixW is operated exactly like any other MFSK mode, by clicking the desired centre frequency on the waterfall or spectrum display.

Frequencies currently being used for Contesti seem to be:

- For 125/250/500 bandwidth just above the BPSK63/125 frequencies
- 40 meters, 7072-7074
- 30 meters, 10134-10139
- 20 meters, 14100-14112

The best combination for calling CQ is probably 500 Hz, 8 Tones. However a common practice now is to call in whatever mode the operator wants to work in. Be carefull using the 1000 Hz width, and particularly changing from 500 Hz, to 1000 Hz, that you do not cause interference to other users.

## **CW**

### **CW Intro & Theory**

#### **CW and Morse Code. With thanks to Steven R. Hurst, KA7NOC**

CW stands for "continuous wave", but when hams use the term today they are referring to the use of the International Morse Code to communicate with a series of on and off pulses of a single RF frequency.

Morse code is named after Samuel F.B. Morse, 1791-1872. The code consists of a series of dots and dashes. Each letter of the alphabet and numbers 0 through 9 have individual combinations assigned to them. For example, the letter "E", is a single "dit" making it the easiest letter to learn and send. Some people can copy code at speeds of up to 70 words per minute, but most hams copy in the 10 to 30 words per minute range. Once you get over the learning curve, Morse code becomes a second language, and you begin to hear "words", not just individual letters. You begin to recognize the rhythm of the words so you can easily pick them out and follow along with the conversation.

Novice hams usually send CW with a "straight" or hand key and copy each letter and word of a QSO as they hear it on their receiver. If they enjoy CW they may graduate to sending with a semi-automatic "bug", or use paddles and an electronic keyer for fully automatic dots and dashes.

#### **CW as a computerized digital mode.**

With a program such as MixW, CW can be sent and received using the keyboard and the computer screen, just as is done with the more recent digital modes. MixW will copy computer-generated code nearly without error. It will also copy code sent well with an Iambic paddle and electronic keyer, so long as the timing is good. It can even accommodate small variations if the user is adept at picking out the good copy from the bad on the screen. Most code sent by hand, however, is simply not printable by computer. The timing is just not consistent enough for the computer to understand. In these situations being able to copy the code by ear will help supplement the code that the computer copies for you.

Sending CW from the keyboard is particually valuable for individuals who have a physical impairment and can no longer use a key or paddles, but still love to operate CW and can copy the code at high speeds in their heads.

## **CW Operation**

### **Configuration**

There are 5 different methods for operating CW with MixW4.

1. Manual sending and receiving (while the transceiver is in CW mode).
2. Direct CW keying. Using the computer to key the transceiver (your transceiver is in CW mode)
3. Using a CAT command to your transceiver (your transceiver is in CW mode).
4. Using a WinKeyer (your transceiver is in CW mode).
5. Sending and receiving with the soundcard (your transceiver is in digital mode)

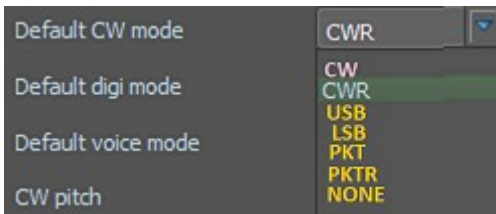
### **Setting your transceiver operating mode**

You set your choice to TX via Sound card or TX via CAT Interface using the menu in the CW [Transmit Status bar](#).

To set your transceiver to the correct operating mode when CW mode is selected for use by MixW4

Select CAT  then  Settings

Default CW mode drop down menu.



Select CW for LSB transmission.

Select CWR for USB transmission.

For TX via Sound card select the same setting as you use for Default digi mode.

Select NONE to not change the transceiver mode.

### TX CW via CAT interface

With your transceiver in CW mode you have the ability to use the in built filters to enhance reception.

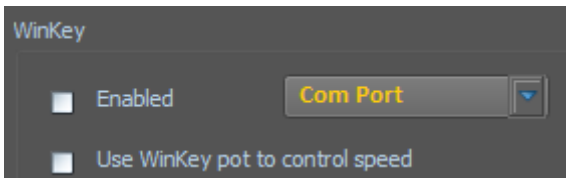
**Manual Sending and Receiving:** In the manual mode you only use MixW as a tuning and logging program. Select CW mode and right click in the Rx window. Now select Mode Settings and select the settings in the menus to suit your style of sending. Plug your key into your transceiver. The frequency of the CW transmission is set by the transceiver, so MixW will lock the TX on the waterfall and display the red flag there. You can set the RX frequency wherever you want since you will be decoding by ear. You can use MixW's logging for [Runtime QSO Input](#). You must tune with the transceiver, but watching the waterfall will help you set your TX frequency right on top of the station you are answering.

**Direct CW keying:** Using this method MixW directly keys your transceiver via a connection between your computer's COM port and your transceiver's key input (a PTT type circuit is used for this connection). This works in the same way as connecting any external keyer to your transceiver, the only difference is that MixW (and your computer) are acting as the external keyer. In this case your transceiver is operated in the CW mode, and you truly are sending CW.

**CAT command: MixW4 does not yet support CAT command operation.**

**WinKeyer:** A WinKeyer must be connected to your PC. Configure the WinKeyer from the CAT settings screen.

Select CAT  then 



Configure the Com Port.

Click on Use WinKey pot to control speed if required.

Click on Enabled and save the settings.

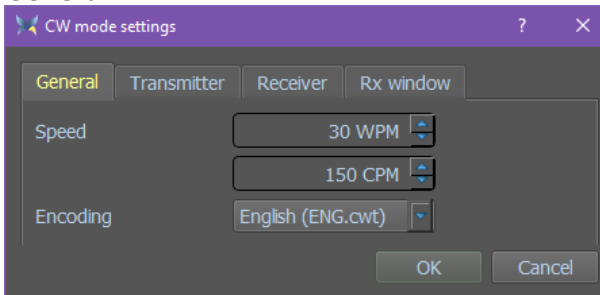
MixW4 will send the file `{data_root}\winkey.ini` contents to the WinKeyer. Now operate in the same way as for direct CW keying.

### TX CW via the Sound card

For [CW via the Sound card](#) make sure your transceiver is in the mode you use for PSK operation. You now operate as if you were using other digital modes (except FT4/FT8/JT65).

## CW Mode Settings

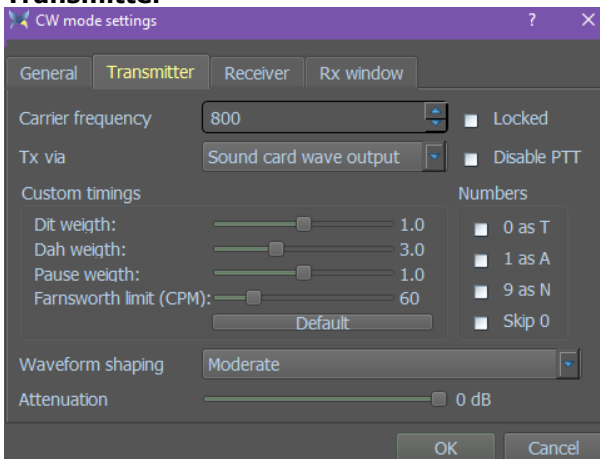
### General



Set the CW speed in Words per Minute or Characters per Minute.

The only Encoding available is English.

### Transmitter



Set the transmit carrier frequency.

Set the transmit mode to CW via Sound card or Cat. In CAT mode the transmit frequency will be locked.

Disable setting the PTT line.

Custom timings allow you to personalise the timings to suit your sending style.

Default restores these settings

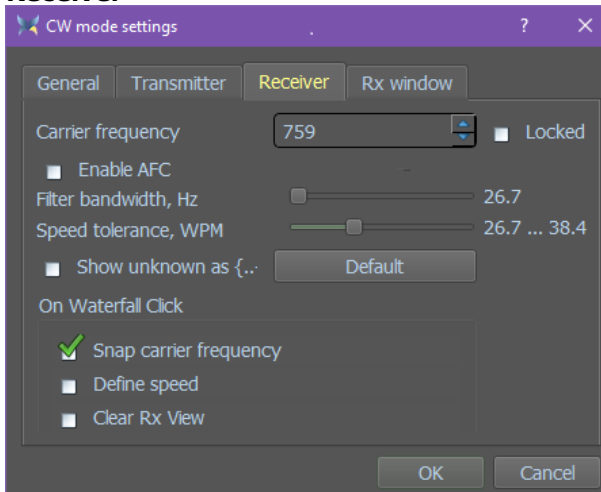
Replace the numbers sent in RST and contest Exchange.

Skip 0 - Ignore 0 when leading digit in contest exchange.

Shape the waveform to suit your local conditions.

Attenuate the signal sent to the transceiver.

## Receiver

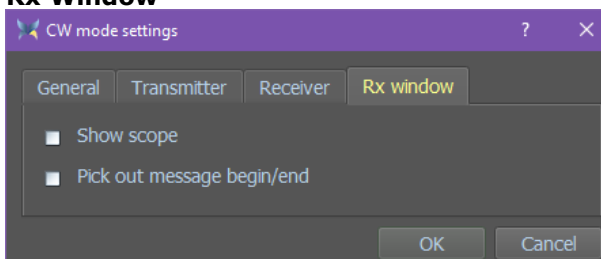


- Set the Rx frequency on the waterfall. It can be locked.
- Enable or disable AFC.
- Set the filter bandwidth. Signals will only be decoded within this bandwidth.
- Speed tolerance sets the range the RX signal speed can change and still be decoded.
- Default restores the above 2 settings to their original values.
- Show a failed letter decode as this pattern in the RX window.
- On Waterfall Click.
  - Position the receive cursor on the signal.
  - Define the speed of the receive signal.
  - Clear the Rx window.

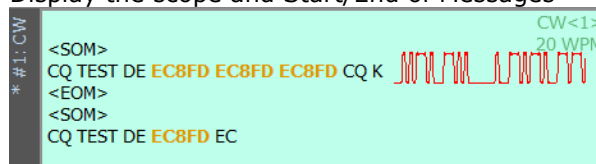
### Note: Decode Speed and Sensitivity

For higher decoder sensitivity set the "Filter bandwidth" and "Speed tolerance" sliders fully left. Set the sliders fully right for a wider range of keying speed and bandwidth. The decoder becomes less sensitive to weak signals and more affected by noise. The absolute values are decided by the WPM setting.

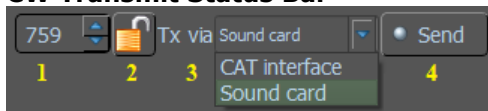
## Rx Window



Display the scope and Start/End of Messages



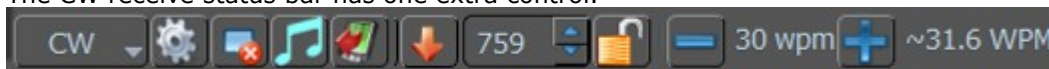
## CW Transmit Status Bar



1. Transmit audio frequency
2. Lock/Unlock transmit frequency toggle.
3. Drop down menu allows choice of CW via the sound card or CW using the CAT interface. To use the Winkeyer select CAT interface.
4. Send indicator and control. Changes to red when in transmit.

## CW Receive Status Bar

The CW receive status bar has one extra control.



The and keys allow immediate CW speed adjustment.

Two macros are available for speed display and adjustment.

- <CPM> Inserts the CW speed in Characters per Minute to the transmit window.
- <WPM> Inserts the CW speed in Words per Minute to the transmit window.
- <CPM:n> Sets the CW speed to *n* Characters per Minute (use +/- for a relative adjustment).
- <WPM:n> Sets the CW speed to *n* Words per Minute (use +/- for a relative adjustment).

## FT4

### FT4 Introduction and theory

FT4 was developed by Joseph H. Taylor, K1JT, Steven J. Franke, K9AN and Bill Somerville, G4WJS.

FT4 is an experimental digital mode specially designed for contests.

Like FT8, it uses fixed length transmissions, structured messages with formats optimized for minimal QSOs, and strong forward error correction.

T/R sequences are 6 seconds long, so FT4 is 2.5 x faster than FT8 and about the same speed as RTTY.

FT4 can operate with signals 10 dB weaker than required for RTTY, while using much less bandwidth.

FT4 message formats are the same as those in FT8 and encoded with the same (174.91) low density parity check code.

Transmissions last 4.48 seconds, compared to 12.64 seconds for FT8.

Modulation uses 4-tone frequency shift keying at approximately 23.4 baud, with tones separated by the baud rate.

The occupied bandwidth (which contains 99% of the transmitted power) is 90 Hz (source UBA).

## Display and control windows.

The screenshot shows the main interface with three windows. The 'All decodes' window on the left lists decoded signals with call signs like UR7MX EA3FHP R-08 and EW8W KO42. The 'My activity' window in the middle shows transmitted signals. The 'QSO controls' window on the right has checkboxes for 'Automated' and 'Respond To First', radio buttons for 'Time Slot To Transmit' (Even, Odd, Any), and fields for 'DX' (UA3PRS, KO84, -03) and 'Standart Messages' (CQ 2E0BPP IO83).

### All decodes

This window displays a list of decoded signals. Each entry includes a timestamp, signal strength, and call sign. For example, '15:14:50 -14 ~ 2134 UR7MX EA3FHP R-08'. Some entries have a 's' at the end, indicating they are 'ustacked'. The window has a scroll bar and buttons for 'Only CQ', 'Auto Scroll', 'Tune on click', 'Clear', and 'To end'.

The letters **O** and/or **s** maybe found to the right of the decoded signal.

**O** indicates a weak or noisy signal. This has been decoded by the soft decoder (OSD).

**s** indicates this decode has been found beneath another signal.

Multiple **s** show signals that have been 'ustacked' **s** count times.

**Only CQ** - only display CQ messages

**Auto Scroll** - Scrolls this window

**Tune on click** - MixW4 tunes to the call clicked on.

**Clear** - Clear this window

**To end** - Scroll to end of all decodes list.

### My activity

This window shows the data transmitted by MixW4. It lists the time, signal strength, and call sign for each transmission, such as '15:14:57 +19 ~ 1327 CQ EW8W KO42'. It includes a scroll bar and buttons for 'Rx Frequency On', 'Clear', and 'To end'.

This window displays the data transmitted by MixW4 and the signals decoded from the Receive frequency setting if enabled below.

**Rx frequency on** - Display data on the RX frequency.

**Clear** - Clear this window.

**To end** - Scroll to end of My activity list.

### QSO controls

This window contains settings for QSO control. It has checkboxes for 'Automated' and 'Respond To First'. The 'Time Slot To Transmit' section has radio buttons for 'Even', 'Odd', and 'Any'. There are fields for 'DX' (UA3PRS, KO84, -03) and a 'Generate' button for 'Standart Messages'. A list of messages is shown, with 'UA3PRS 2E0BPP R-03' selected. There is a 'Send' button and a progress bar for 'Tx: [UA3PRS 2E0BPP R-03] 55%'. At the bottom are 'Clear QSO' and 'Log QSO' buttons.

**Automated** QSO controlled by MixW4.

**Respond to First** First identified caller to your CQ answered.

**Time Slot To Transmit** Either the Even start seconds (0/30), the Odd start seconds (15/45) or MixW4 chooses for you.

**DX:** The Call, WW Locator square and your Signal strength as reported from the remote station.

**Standard Messages** A list of the messages generated after you have selected a call and clicked on **Generate**.

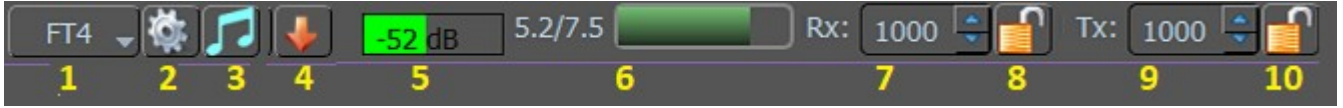
**Send** Transmit. The drop down menu shows non-standard messages you can send.

**Halt TX** Stop transmission. The bar to the right shows the progress of the transmission or Iddle.

**Clear QSO** Clear the DX line.

**Log QSO** Copy the DX line to your log.

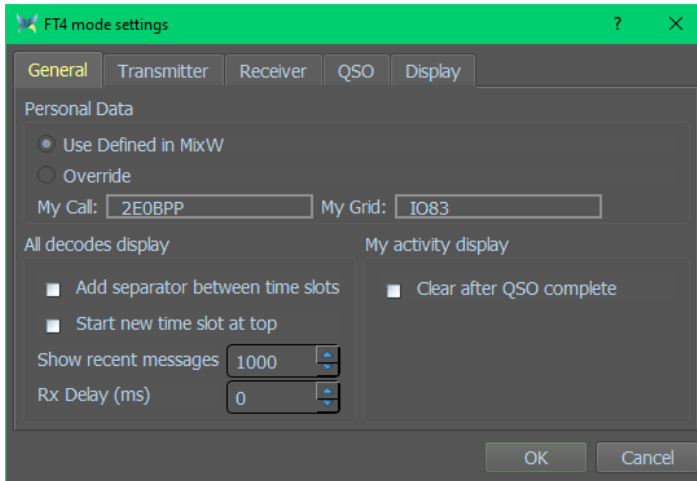
## Status bar



1. Mode FT4.
2. Open Mode settings.
3. Activate the [Tune](#) controls.
4. Save the last 40 seconds of Audio to a file.
5. Receiver input level. Ideally adjust your input for the green shading to cover about 50% of the box.
6. Signal activity period Time bar. 7.5 seconds for FT4.
7. Receive audio frequency.
8. Lock/Unlock receive audio frequency.
9. Transmit audio frequency.
10. Lock/Unlock transmit audio frequency.

## Mode Settings.

### General



### Personal data

Use defined in MixW

My Call & My Grid filled in with your registration data

Override

Use if operating /p, /a etc, Call/Grid

are

temporary

### All decodes display

Add separator between time slots

Start new time slot at top

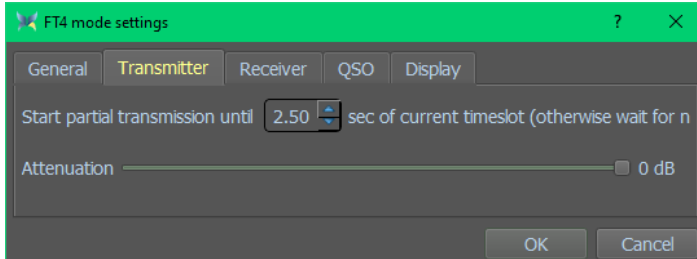
Number of messages to display

Rx Delay (ms)

### My activity display

Clear after QSO complete.

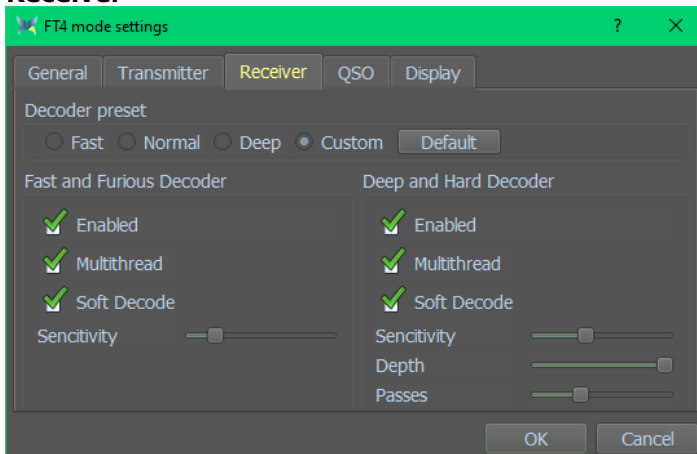
### Transmitter



**Start partial transmission until** - seconds remaining in time slot after which no transmission will take place.

**Attenuation** - Signal attenuation between 0db and -50db.

### Receiver



**Decoder preset** Select from presets

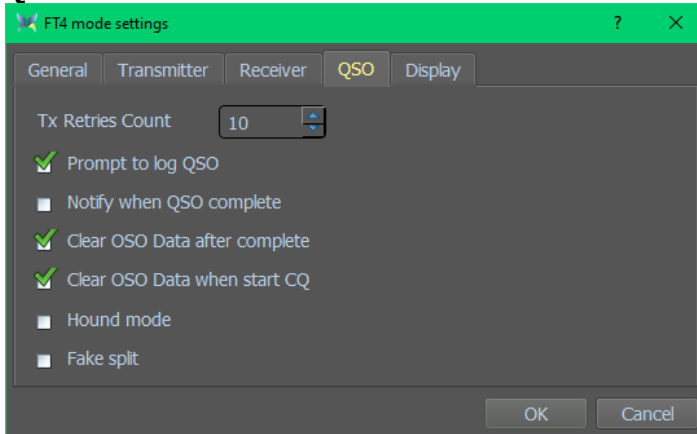
**Fast**  
**Normal**  
**Deep.**

or

**Custom** displays the settings to enable you to make your own choices.

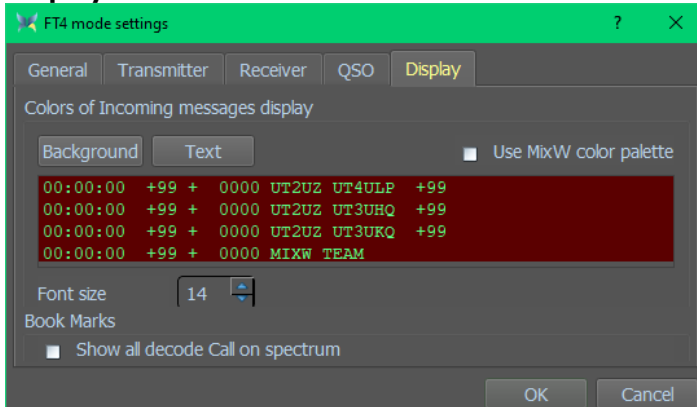
**Default** Returns the settings to the default values.

## QSO



- Tx Retries Count**
- Prompt to log QSO**
- Notify when QSO complete**
- Clear QSO Data after complete**
- Clear QSO Data when start CQ**
- Hound mode**
- Fake split**

## Display



- Colors of Incoming messages display.** - Choose FT4 selection or use the overall MixW colors.
- Font size** Your choice of font size for the FT4 display only.
- BookMarks** - Select whether to display the calls of decoded signals on the display or not. On a busy band the waterfall can become very cluttered.

## FT8

### FT8 Introduction and theory

FT8 was developed by Steven J. Franke, K9AN and Joseph H. Taylor, K1JT. The mode name "FT8" stands for "Franke and Taylor, 8-FSK modulation". FT8 uses 15-second transmit/receive sequences, offers a 50% or better decoding rate down to -20 dB on an AWGN channel and maintains good performance with Doppler fading. An auto sequencing function includes an option to respond semi-automatically to a CQ call. FT8 QSOs are 4 times faster than JT65 or JT9 QSOs. FT8 is an excellent mode for HF DX and for situations such as multi-hop E\_s at 6 meters with a low QSB.

#### Features of FT8

TX / RX sequence length	15s official 13.48 Sec
Message length	77 bit + 12 bit CRC
FEC code	LDPC (174.87)
Modulation	8-FSK, pitch 6.25 Hz
Waveform with constant curve	
Occupied bandwidth	50 Hz
Synchronization	7x7 Costas arrays at the beginning, middle and end
Transmission speed	$79 * 1920/12000 = 12.64$ s
Decoding threshold	-20 dB; a few dB lower with AP decoding

Multi decoder finds and decodes all signals in the passband.  
Optional automatic sequencing and response to a CQ call.  
Performance similar to JT9, JT65.

### Display and control windows.

MixW4 has a choice of two display styles, *JT familiar minimal* or *MixW*. Your choice is made using the [FT8 Mode settings](#) General selection window.

## JT familiar minimal style

## All decodes

The letters **O** and/or **s** maybe found to the right of the decoded signal.

**O** indicates a weak or noisy signal. This has been decoded by the soft decoder (OSD).

**s** indicates this decode has been found beneath another signal.

Multiple 's' show signals that have been 'unstacked' s count times.

**Only CQ** - only display CQ messages

**Tune on click** - MixW4 tunes to the call clicked on.

**RX frequency on** - Used by the My activity display (below).

## My activity

This window displays the data transmitted by MixW4 and the signals decoded from the Receive frequency if enabled below.

**Rx frequency on** - Display data on the RX frequency.

## QSO controls

- DX:** and the two lines below - Call, Locator and received signal report of the station you are working.
- Generate** - Click to create the 5 standard QSO messages associated with the DX call.
- The 5 standard message slots** plus your CQ call message, Tx1 - Tx6. The dot next to the messages indicates which one will be sent next.

Message Tx4 maybe changed.

Select Mode Settings General. Switch to JT familiar minimal User interface.

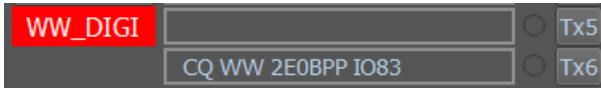
Right click in the Tx4 message box. One of 3 messages maybe selected:

If you were using MixW User interface switch back.

- Auto Seq** - MixW4 controls the message sending sequence.



5. **Call 1-st** - First identified caller to your CQ answered.
6. **TX 15/45** - Set your TX start time at 15 or 45 seconds in the minute.
7. **Erase** - Clear all data.
8. **Log QSO** - Copy the DX information to the log.
9. **Clear QSO** - Clear the DX data.
10. **Enable Tx** - Allow next message to be sent at next 15sec time slot start.
11. **Halt Tx** - stop transmission immediately.



The DIGI label is displayed if WW Digi Contest mode is selected



The HOUND label is displayed if HOUND mode is selected

## MixW style

The screenshot shows the MixW interface with three main panels:

- All decodes:** A list of decoded signals with columns for time, frequency offset, signal strength, call sign, and name. The signal 'CQ UN7DT NO00' is highlighted in green.
- My activity:** A list of transmitted signals with columns for time, frequency offset, call sign, and name. The signal 'CN8DN F4DIA -21' is highlighted in blue.
- QSO controls:** A control panel with checkboxes for 'Automated' and 'Respond To First', radio buttons for 'Time Slot To Transmit' (Even, Odd, Any), and a 'Generate' button. Below it is a 'Standart Messages' section with a dropdown menu showing 'CQ 2E0BPP IO83' and a 'Send' button. At the bottom are 'Clear QSO' and 'Log QSO' buttons.

At the bottom of the interface, there are several control buttons: 'Only CQ', 'Auto Scroll', 'Tune on click', 'Clear', 'To end', 'Rx Frequency On', 'Clear', 'To end', 'Clear QSO', and 'Log QSO'.

## All Decodes

This screenshot shows the 'All Decodes' panel with five numbered callouts:

1. Only CQ
2. Auto Scroll
3. Tune on click
4. Clear
5. To end

The letters **O** and/or **s** maybe found to the right of the decoded signal.

- O** indicates a weak or noisy signal. This has been decoded by the soft decoder (OSD).
- s** indicates this decode has been found beneath another signal. Multiple 's' show signals that have been 'unstacked' s count times.

1. Only CQ - Only display CQ messages.
2. Auto Scroll - Scrolls this window.
3. Tune on click - MixW4 tunes to the call clicked on.
4. Clear - Clear this window.
5. To end - Scroll to the end of the window.

## My Activity

This screenshot shows the 'My Activity' panel with three numbered callouts:

1. Rx Frequency On
2. Clear
3. To end

This window displays the data transmitted by MixW4 and the signals decoded from the Receive frequency if enabled below.

1. Rx Frequency on - Display data received on the Rx frequency.
2. Clear - Clear the My Activity window.
3. To end - Scroll to the bottom of the window.

## QSO Controls

**Automated:** MixW controls the QSO message sending sequence.

**Respond to first:** respond to first caller to your CQ.

**Time Slot To Transmit:** Select from Even (0/30 secs), Odd (15/45 secs) or let MixW decide.

**DX:** Call, WW locator and the analysed signal report of selected station.

**Standard Messages:** your CQ call and the 5 standard messages created after **Generate** has been clicked.

Next message to be sent. Click **Send** to transmit this message. Type your own message in this box. Maximum 13 characters.

Progress of sent message. Click **Halt Tx** to terminate the transmission.

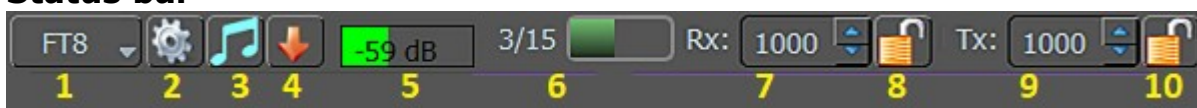
**Clear QSO:** Clear the above QSO.

**Log QSO:** Copy the QSO details to the Log.

The DIGI label is displayed if WW Digi Contest mode is selected

The HOUND label is displayed if HOUND mode is selected

## Status bar



1. Mode FT8.
2. Open Mode settings.
3. Activate the [Tune](#) controls.
4. Save the last 40 seconds of Audio to a file.
5. Receiver input level. Ideally adjust your input for the green shading to cover about 50% of the box.
6. Signal activity period Time bar. 15 seconds for FT8. The green progress changes to red when a message is being transmitted.
7. Receive audio frequency.
8. Lock/Unlock receive audio frequency.
9. Transmit audio frequency.
10. Lock/Unlock transmit audio frequency.

## Mode Settings.

### General

### User Interface

JT familiar  
 MixW  
 UT2UZ Auto-JT (coming soon)

### Personal Data

Use Registration data - Call and Grid fields default.

Override - Use when not using your normal call/location.

**Displays** Add separator between time slots

Start new time slot at top

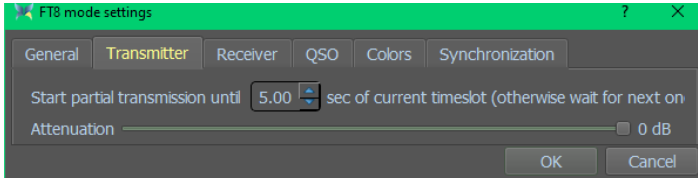
Clear Activity after QSO Complete

Show all decode call on spectrum

Show recent messages

Select font

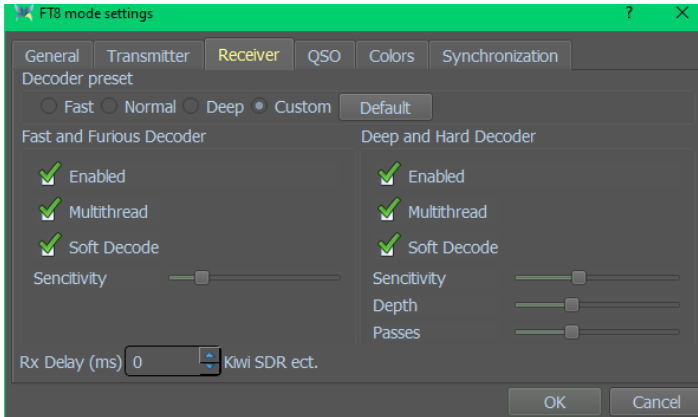
## Transmitter



**Start partial transmission until** - seconds remaining in time slot after which no transmission will take place.

**Attenuation** - Signal attenuation between 0db and -50db.

## Receiver



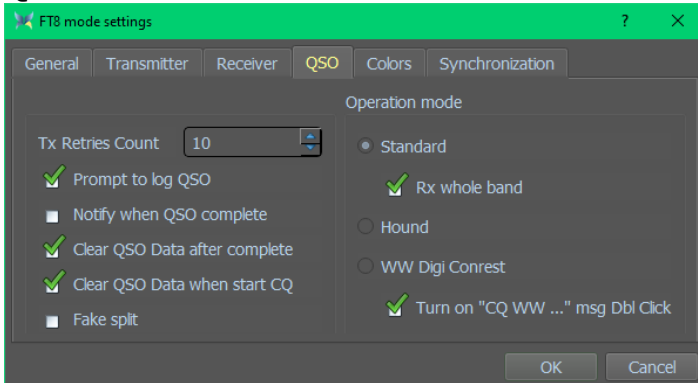
**Decoder preset** - Select from presets **Fast**, **Normal** or **Deep**.

**Custom** displays the settings to enable you to make your own choices.

**Default** Returns the settings to the default values.

**Rx Delay (ms)** for KiwiSDR etc.

## QSO



**Tx Retries Count** - Number of repeats for the current message.

The next 5 controls are on/off toggles.

**Prompt to log QSO**

**Notify when QSO complete**

**Clear QSO Data after complete**

**Clear QSO Data when start CQ**

**Operation mode**

**Standard** - Normal operation.

Rx whole band is used with Hound mode

**Hound mode**

**WW Digi Contest**

Turn on CQ WW ... msg DblClick

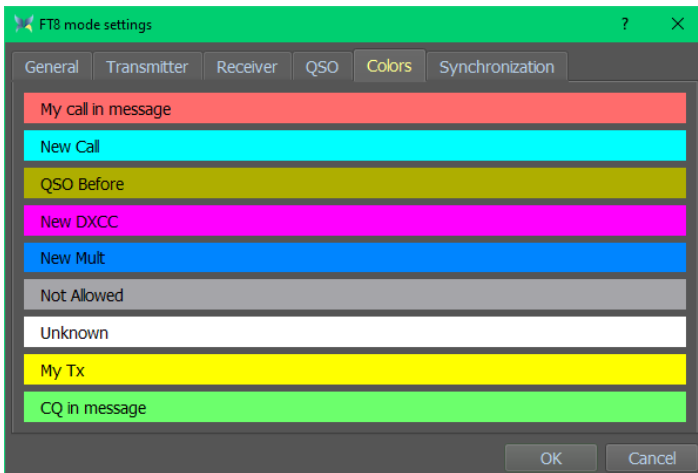
**Fake split:** Split mode assumes different Tx and Rx frequencies, either by using two VFOs or different frequencies on the waterfall.

FT8 defaults to one VFO for Tx and Rx. This means the Tx and Rx frequencies are the same.

Manual split mode can be done by locking the Tx frequency.

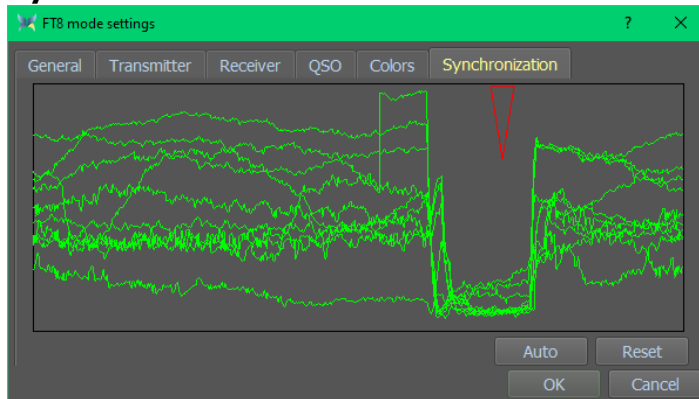
Fake split option allows emulation of split mode by automated Rx frequency changing.

## Colors



Double click on a colour bar and use the palette screen to select your desired colour for this line.

## Synchronization



This display shows the input signal amplitude for each 15 second timeslot. The red triangle shows the timeslot boundary. When the operating system timer is synchronized the triangle should be in the middle of the waveform dip.

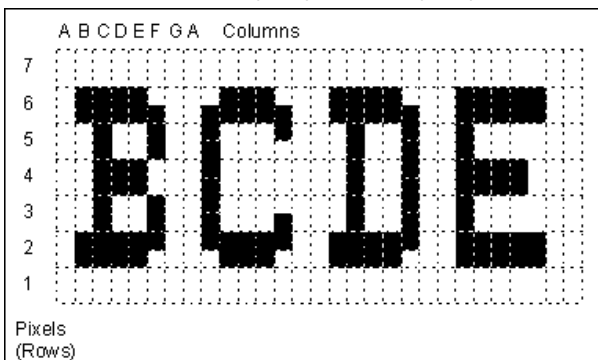
Auto: not yet implemented.  
Reset: Clear the display. The display restarts immediately.

## Hellschreiber Hellschreiber Intro By Murray Greenman, ZL1BPU

### Feld-Hell

Hellschreiber was patented in 1929, and is still in use today using the original format. Hellschreiber was the first successful direct printing text transmission system, and was very popular at a time when teleprinters were complex and expensive (the Hell receiving mechanism had only two moving parts). At first the Hellschreiber was mostly used for landline press services, which continued well into the 1980s. A military version was used by the German Condor Legion during the Spanish Civil War (1933). During WWII, Hellschreiber was widely used for field portable military communications, for which it proved to be very suitable because the equipment was simple and robust. Today we use the term "Feld-Hell", or "Field Hell" for this system, to help differentiate it from the slightly different landline press systems.

Each character of a Feld-Hell transmission is portrayed as a series of dots, in a matrix, just like the printing of a dot-matrix printer. The dots are sent one at a time, rather like Morse code. Feld-Hell transmits in the following order - up each column from bottom to top, then up each successive column from left to right. The following picture shows a fragment of text "BCDE", depicting the order in which the dot elements are printed. Each of the dotted rectangles represents a potential dot location, and is identified by a locating letter/number. The transmit order therefore is A1, A2, A3... A7, B1, B2... etc.



In this picture, the dotted rectangles depict individual dot locations in the matrix. There are blank, untransmitted picture elements (pixels) at the top and bottom of each character, and between characters. These are depicted as empty white rectangles. The transmitted (key down) pixels are shown black. Looking at the above diagram, it is easy to see that the transmitter duty cycle is quite low (about 22%). Another way of saying this is that the peak-to-average ratio is very high, which is important for good readability in noise. 150 characters are transmitted every minute. Each character takes 400ms. Since there are 49 pixels per character, each pixel is 8.163ms long. The effective baud rate is  $1/8.163\text{ms} = 122.5$  baud, and the throughput is 2.5 characters/sec, or about 25 WPM.

The original Feld-Hell equipment, and the best software implementations, transmit two pixels (each half height, or half the duration) for every pixel shown in the diagram, thus improving the vertical resolution. If you look carefully at the above diagram, you can see how this comes about without increasing the signal bandwidth. Rudolf Hell designed the font so that a single half-height pixel is never transmitted. For example, the right side of the "B" has enhanced resolution achieved by slipping the timing of the full-height pixels by half the height of one pixel. Three half-height pixels are transmitted without a break, so the bandwidth is not increased.

Another important reason for the restricted bandwidth design, while providing well-defined characters, was that this technique ensured that pulses to the radio transmitter were never less than 8ms. Shorter (half-pixel) pulses could be severely distorted by the slow rise-time of the transmitter, and as a result, cause excessive bandwidth or fail to energise the mechanical print hammer in the receiver.

The output of the wartime Feld-Hell machine was a 900 Hz keyed audio tone, sent on a telephone line or to a transmitter modulator, for example an MCW transmitter. It was possible in some models to separate the keying

contacts for direct keying of a CW transmitter. Feld-Hell is therefore amplitude keyed, just like Morse, as CW or MCW. Each pixel of a dot matrix character is sent in a fixed pattern as a CW dots. Where there is no black dot, nothing is sent. Feld-Hell is in reality a simple facsimile mode. The early press system, F-Hell was identical except that it ran at 245 baud (5 characters/sec). An asynchronous variant, GL-Hell, (used by land-line machines) utilised a fixed start block of pixels at the left of each character, which provided character based synchronism, but this method has no advantage to Amateurs. An excellent article describing the traditional mechanical method of transmitting and receiving Feld-Hell appeared in Ham Radio Magazine, December 1979. An article which describes the Hell font and includes other useful information was printed in Radcom, April 1981. The actual machine described by the late G5XB in that article is now in the possession of Ian G4AKD. The Siemens A2 war-time machine is also described in detail on the Feld-Hell History page.

For more information including a summary of the different Hell formats, see: [Murray's Website on Hell modes.](#)


## PERFORMANCE

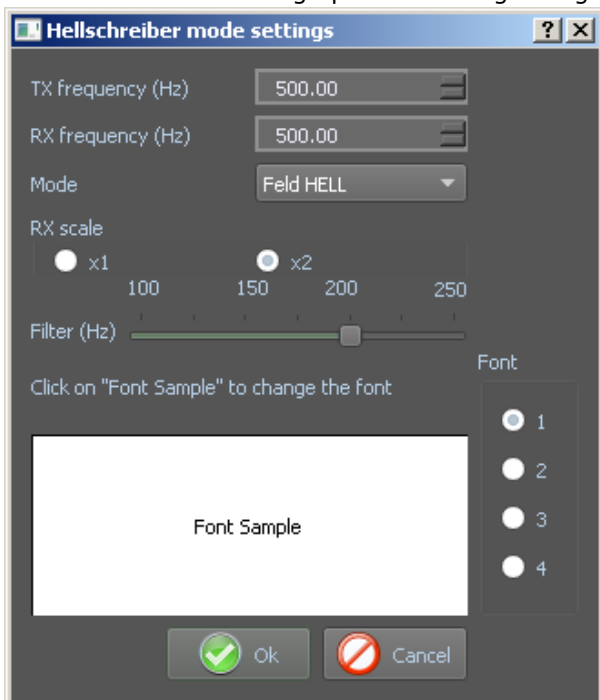
Feld Hell performs very well where the path has reasonable stability (little fading) and where the signal level is equal to the average noise or better. If gray-scale reception is used, performance at low signal to noise is much better. Feld-Hell is reasonably immune to interference, but can be badly affected by on-frequency carriers or Morse.

## Hellschreiber Operation

Hellschreiber is a unique mode. Some would argue that it is not a digital mode at all. Still for our purposes, because we are certainly using digital techniques to operate Hellschreiber, we will call it a digital mode. It has more of a clicking, or chirping sound than the other, more recent digital modes. Receiving Hellschreiber text is more like receiving a FAX image. The characters you receive and transmit are actually pictures of characters.

Hellschreiber is another narrow band mode, like PSK31, and will benefit from the same transceiver settings. To review these settings please see the PSK31 Operation topic.

First switch to the Hellschreiber mode. Next bring up the mode settings by clicking the  icon on the mode status bar. This will bring up the following dialog box:



The **TX & RX frequencies** show the location of your cursor in the spectrum window.

**Mode:** Select one of 3 sub-modes: Feld HELL, FM 105bd or FM 245 bd

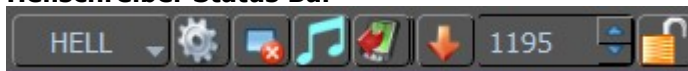
FM Hell modes use a two diamond cursor in the waterfall.

**RX scale:** Using x2 scale may help decipher hard to read characters but you will lose some text on each screen.

**Filter:** A selectable software DSP filter between 100 and 250Hz width is available. Varying this setting may improve your reception during differing conditions. A setting of 200Hz seems to work well overall.

**Font Selection;** One of 4 fonts can be selected **for transmission**. Click on the required button and then click in the font sample window. The receive font is selected by the sending station.

## Hellschreiber Status Bar



There are no unique settings on this status bar.

## Receiving Hellschreiber

Tune in a Hellschreiber signal by pointing right in the center of the signal with the mouse and clicking the left mouse button. The text being sent by the station will then appear in the Receive Window.

## Transmitting Hellschreiber

To transmit to a station, first tune it in as indicated above. Type outgoing text in the Transmit Window. Click the T/R button, and the text in the Transmit Window will be transmitted. You can continue to type, and that text will also be transmitted. As it is being transmitted, text in the transmit Window will also appear in the Receive Window. To stop transmitting, press the T/R button again. Pressing ESC will abort transmission and return MixW to receive mode, but the last several characters typed will not be transmitted.

# MFSK

## MFSK Intro & Theory By Murray Greenman, ZL1BPU

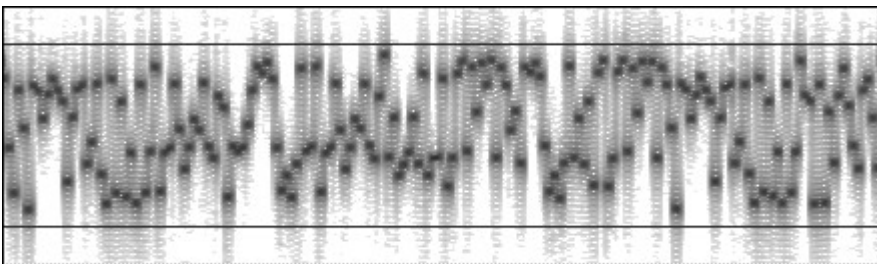
### MFSK Overview for Beginners

MFSK is a technique for transmitting digital data using multiple tones, extending the RTTY two-tone technique to many tones, usually, but not always, one tone at a time.

MFSK means Multi - Frequency Shift Keying, and should not be confused with MSK (Minimum Shift Keying). There are a number of different techniques, using concurrent (or parallel) tones, sequential (one after another) tones, and combinations of tones. MT-Hell can be either concurrent or sequential, DTMF tones used for telephone signaling are concurrent tone pairs, while Piccolo and Coquelet, although using tone pairs, are decidedly sequential.

MFSK transmissions have a unique sound, almost musical, which is why Piccolo and Coquelet received their names (Coquelet means rooster).

MFSK uses relatively narrow tone spacing, so remarkable data rates are achieved for a given bandwidth - 64 bps in a signal bandwidth of 316 Hz is typical. The following picture is a spectrogram of an MFSK16 signal (16 carriers) with a spacing of 15.625 Hz and operating at 15.625 baud. The transmission operates at 62.5 bps (about 80 words per minute!) and occupies about 316 Hz of bandwidth. The two black horizontal lines in the picture are at 1000 Hz and 1300 Hz, and the horizontal scale is about 20 seconds. This short transmission contains about 120 letters. MFSK16 is always operated with FEC, so the text throughput is actually only about 42 WPM (31.25 bps).



**Spectrogram of an MFSK16 Signal**

### Advantages

MFSK has several performance advantages:

- High rejection of pulse and broadband noise due to narrow receiver bandwidth per tone
- Low baud rate for sensitivity and multi-path rejection - data bit rate higher than symbol baud rate
- Constant transmitter power
- Tolerance of ionospheric effects such as doppler, fading and multi-path

Most important of all, with an MFSK system, the error rate improves as the number of tones is increased, so with as many as 32 tones the performance is unrivalled. With PSK systems the opposite is true.

### Disadvantages

Let's be fair - there are disadvantages to MFSK! The main disadvantages are related to the narrow spacing and narrow bandwidth of the individual tone detectors - drift can be a problem and accurate tuning is essential. Good tuning indicators and AFC are necessary at the slower speeds. It is important that the radio transceiver be very stable, and also that it has very small frequency offset between transmit and receive (preferably less than 5 Hz).

MFSK also uses more bandwidth for a given text speed than a 2FSK or PSK system, but by the same token it is therefore more robust.

### Alphabet Coding

There are many ways to encode the alphabet from the keyboard for transmission. Perhaps the most common now is ASCII (ITA-5), but ITA-2 (as used by teleprinters) is common. MFSK16, like PSK31, is based on a Varicode, which, unlike most such alphabets, assigns a different number of bits to different characters, so that more frequently used characters have fewer bits and are therefore sent faster.

The number of bits per alphabet character therefore depends on the character frequency, just like Morse. For example:

#### Character Varicode

space	100
a	101100
e	1100
E	111011100
Z	101010110100

Thus, the alphabet coding performance depends on the chosen code, and with a Varicode, even on the text sent:

## Alphabet Bits/Char

ITA-5 ASCII 10

ITA-2 7.5

Varicode ~ 7-8

The strength of the varicode is that the alphabet is essentially infinitely expandable. For example, all the European accented characters are defined, and others have been added for control purposes, that are outside the character set. The MFSK16 varicode is not the same as the PSK31 varicode, although the technique is similar.

Another important advantage of using a varicode is that the stream of data can be much more quickly re-synchronized in case of errors, than is possible with other systems, and so a minimum of data is lost.

## Text Throughput

The user is most interested in the actual usable text throughput, which is specified in characters per second (CPS) or words per minute (WPM). Both depend on the alphabet used, and the number of words per minute depends on the average word size. In English this is taken for convenience to be five letters plus a letter space. So we can say that:

**Text Throughput (CPS) = User Data Rate / Alphabet Bits per Character**

**Text Throughput (WPM) = CPS x 60 / letters per word**

## Worked Example

Say we are using an MFSK system with 16 tones (16FSK), operating at 15.625 baud with FEC Rate = 1/2, and an ASCII alphabet using 10 bits/character. Then:

Symbol Rate = 15.625 baud

Channel Data Rate = 15.625 x log<sub>2</sub>16 = 15.625 x 4 = 62.5 bps

User Data Rate = 62.5 x 1/2 (FEC RATE) = 31.25 bps

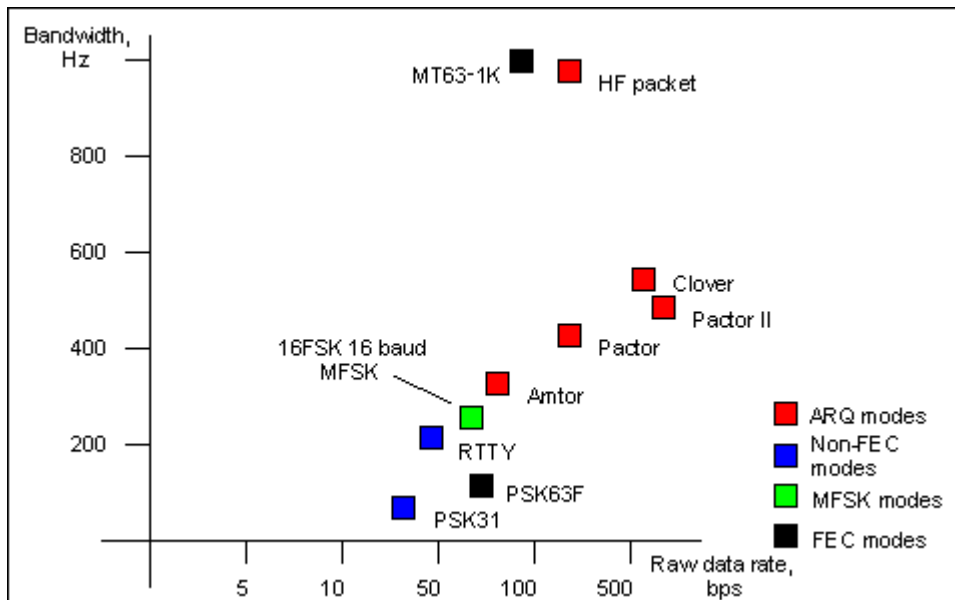
Text Throughput (CPS) = 31.25 / 10 CPS = 3.125 CPS

Text Throughput (WPM) = 31.25 x 60 / (10 x 6) = 31.25 WPM

This will take place in a bandwidth little more than 16 x 15.625 = 250 Hz.

## Comparisons

Amateur Radio RTTY operating at 45.45 baud achieves 60 WPM with no error correction, and requires about 300 Hz bandwidth. 300 baud packet is error corrected, but is unsuited by its design to HF conditions, and rarely delivers better than 30 WPM, and often much less. Packet requires 1 kHz bandwidth. PSK31 operates at 31.25 baud, and in QPSK mode gives error corrected text at 31.25 WPM approximately. It has the narrowest bandwidth, less than 100 Hz.



**Graph showing raw data rate of various digital modes versus approximate bandwidth.**

In terms of performance, of the examples given, only MFSK16 and PSK31 are considered practical for DX QSOs. PSK31 often performs poorly on long path, and provides no improvement when the FEC is used, so is usually used without it. MFSK is virtually as sensitive as PSK31 in practice and is unaffected by Doppler. It is also less affected by interference, and offers effective FEC. These results are supported by ionospheric simulation tests.

## MFSK16

The new MFSK16 mode includes continuous phase tones and many other improvements, especially to the receiver. The mode is loosely based on Piccolo, but differs in a few important ways:

- The transmitted data is bit oriented, rather than character oriented.
- The fundamental signal is a single symbol, not a symbol pair.
- Error reduction coding is built in.
- Tone spacing and baud rates are divisions of 125.

- The transmitted tones are phase synchronous CPFSK.
- No symbol phase or other AM information is transmitted.

1. The system can therefore potentially transmit text and binary files, any alphabet including varicodes, and can use error coding.
2. The tones and baud rates (15.625 Hz, 31.25 Hz etc) are chosen to allow straightforward PC sound card sampling at 8 kHz sample rate.
3. This means the transmitter need not be linear. Using the receiver FFT, the transmitted carrier phase can be extracted, and from it the symbol phase is deduced. This technique is very fast and reliable.

Of course MFSK16 is computer oriented, rather than an electromechanical system, so will be easy and inexpensive to install, and easy to operate, with no performance compromises.

- Accurate tuning for transceive operation using "point and click" techniques
- Convolutional coded FEC (Forward Error Correction) with interleaver for error reduction
- FFT (Fast Fourier Transform) symbol filtering and detection
- Symbol sync recovery by measuring transitions or carrier phase in the symbol detector FFT
- Two signaling speeds with differing numbers of tones (but the same bandwidth) to suit conditions

The MFSK Varicode is slightly more efficient than others, since smaller codes are available. This in turn is because the combinations "000", "0000" etc do not need to be reserved for idle and can be used inside character bit streams. Only the combination "001" is forbidden, as this signals the end of one character and the start of the next. The speed on plain language text is almost 20% faster than using the G3PLX varicode. The average number of bits per character for plain text has been measured at 7.44, giving MFSK16 a text throughput of 42 WPM at 31.25 baud user data rate.

Note: Murray has an excellent website with much more information on MFSK16 and other related modes. This is an great resource for anyone interested in learning more about this fascinating new mode:


**MFSK, "The official MFSK website"** Murray Greenman, ZL1BPU. <http://www.qsl.net/zl1bpu/MFSK/>

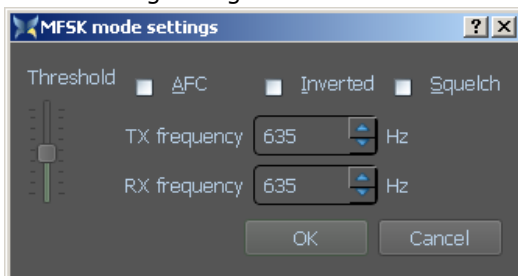
## MFSK Operation

MFSK16 uses approximately the same bandwidth as 170Hz shift RTTY and so your MFSK16 transceiver settings can be roughly the same as those used for standard shift RTTY.

**USB:** USB is the convention for MFSK operation in all bands. Either sideband can be used, but the sender and receiver must be using the same sideband, or one station must be inverted.

### MixW Settings

Bring up the mode settings by clicking the  icon on the status bar. The following dialog box is shown:



**AFC** assists tuning and tracking the MFSK signal.

**Inverted** causes the signal to be inverted.

**Squelch** and **Threshold** can be adjusted to your preferences.

**Tx/Rx frequencies** are the signal centre frequency settings.

### MFSK Status Bar



There are no unique settings on this status bar. The frequency displayed is the centre of the signal.

## Olivia


### Olivia Introduction

Olivia was designed and first implemented by Pawel Jalocho, SP9VRC. The draft specification for the Olivia HF transmission system can be seen at:

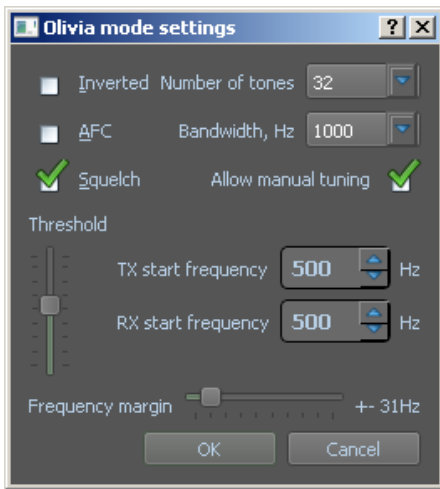
<http://www.qsl.net/a/aa3eu/olivia.htm>

Olivia utilises a full ASCII character set.

### Olivia Operation

Olivia is a version of MFSK, and in MixW the operating procedures are the same as for MFSK with the exception of certain options which can be set in the Olivia mode settings dialog box. Select Olivia mode and by clicking the  icon on the status bar the following dialog box is shown:





**Inverted** causes the signal to be inverted.

**Number of tones** selects from 8 values between 2 and 256

**AFC** assists tuning and tracking the Olivia signal.

**Bandwidth, Hz** selects from 5 values between 125 and 2000

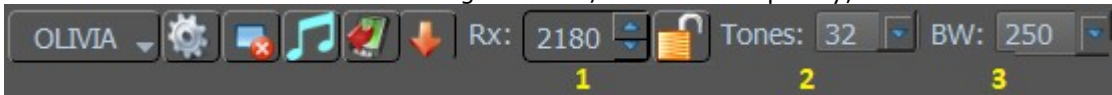
**Squelch** and **Threshold** can be adjusted to your preferences.

**Allow manual tuning** is permanently enabled.

**Tx/Rx start frequencies** are the signal **low** frequency settings.

**Frequency margin** alters the frequency range signals are decoded.

The Olivia status bar allows the setting of the Tx/Rx centre frequency, number of tones and bandwidth.



Status bar unique settings:

- 1 The Tx/Rx **Centre** frequency.
- 2 Number of tones.
- 3 Bandwidth (Hz).

The signals seen on the waterfall are practically identical to Contesti and RTTYM signals. As with all digital modes, after a little experience the user will be able to identify the various formats visually in the waterfall.

### Finding and Tuning Olivia Signals.

Olivia under MixW is operated exactly like any other MFSK mode, by clicking the desired centre frequency on the waterfall or spectrum display.

Frequencies currently being used for Olivia seem to be:

- For 125/250/500 bandwidth just above the BPSK63/125 frequencies
- 40 meters, 7072-7074
- 30 meters, 10134-10139
- 20 meters, 14100-14112

The best combination for calling CQ is probably 500 Hz, 8 Tones. However a common practice now is to call in whatever mode the operator wants to work in. Be carefull using the 1000 Hz width, and particularly changing from 500 Hz, to 1000 Hz, that you do not cause interference to other users.

## PSK

### PSK Introduction

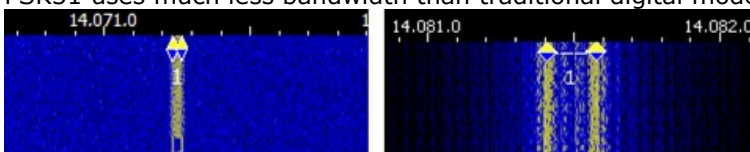
PSK is based on an idea by SP9VRC and developed by Peter Martinez, G3PLX, who also developed AMTOR. Based on RTTY, PSK is used for live keyboard-to-keyboard QSOs at 50 WPM (31 Baud) and uses "Phase Shift Keying" to signal mark and space values, instead of changing the frequency.

DSP is used to change the phase by 180 degrees when a switch from mark to space is needed. DSP analysis by the program instantly detects this "Phase Shift".

PSK31 works in a very narrow bandwidth, which sharply reduces noise and QRM. This narrow signal also makes it an excellent QRP (low power) mode, with between 5 and 10 watts producing excellent inter-continental paths in some cases.

The front-end DSP filter and pulse shaping keep the waveform compact, approximately 40 Hz at -3dB and 80 Hz at -40 dB. Pulse shaping uses a raised cosine to ramp amplitude during phase transitions and leaves the amplitude at full value during no phase reversals.

PSK31 uses much less bandwidth than traditional digital modes as shown here:



PSK31 signal                      RTTY signal  
Waterfall x1 magnification.

### PSK's two modes: BPSK and QPSK

In the QPSK mode, instead of just keying by phase reversals, or 180-degree phase-shifts, an additional pair of 90 and 270-degree phase-shifts are possible.

If you think of BPSK as reversing the polarity of the signal, then QPSK can be thought of as two BPSK signals on the same frequency, but 90 degrees out of phase with each other, and with only half the power in each.

The extra speed in QPSK is used for error correction. This works well under most conditions. Certain noisy

conditions, and weaker signals, can benefit from the full power (single signal) of the QPSK mode.

Visit the PSK31 Official Home Page at:

<http://aintel.bi.ehu.es/psk31.html>

## PSK Operation

### PSK Basics

Due to its limited bandwidth, PSK31 is perhaps the most critical mode for proper soundcard to radio configuration. **Overdriving your transceiver audio input will cause over modulation, creating multiple side bands and interfering with adjacent QSOs.**

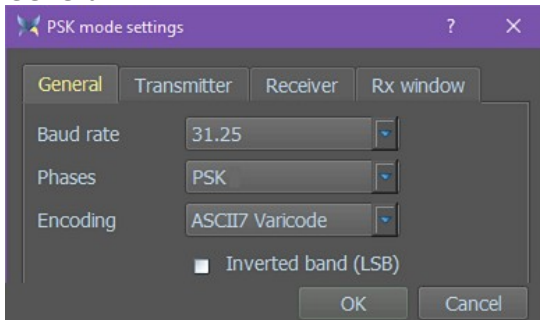
### MixW4 Settings

**Mode** will be set to either PSK31/63/125 or QPSK31/63/125. Most PSK operations are BPSK unless conditions will benefit from the limited error correction offered in the QPSK mode.

### PSK Mode settings

Select PSK mode. Select mode settings by clicking the Settings control on the mode status bar. This brings up the following selection screen:

#### General



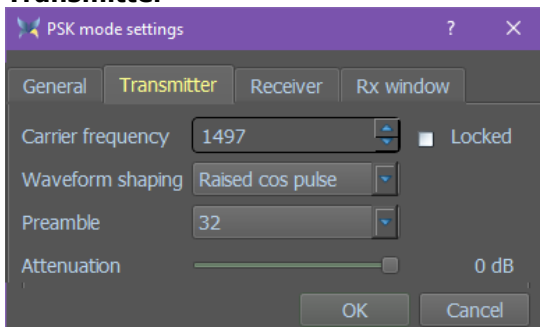
**Baud rate** Select from 31.25, 62.5 or 125. Default 31.25.

**Phases** Select from PSK or QPSK. Default PSK.

**Encoding** Select from ASCII7 Varicode or ASCII8 Var...(+Russian). Default ASCII7 Varicode.

**Inverted band (LSB)** Select the other sideband. The Inverted control only affects QPSK signals.

#### Transmitter



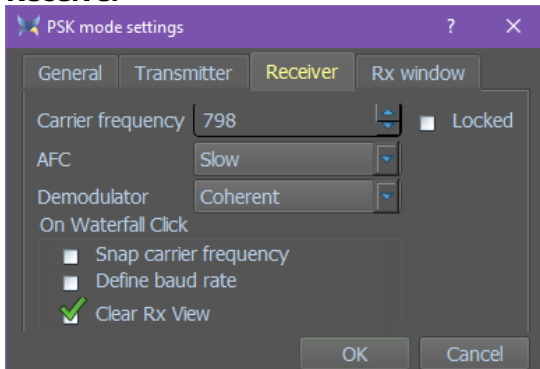
**Carrier frequency** Transmit audio fq in hz. Maybe Locked.

**Waveform shaping** Select from Raised cos pulse. Default Raised cos pulse

**Preamble** Select from 16, 32 or 64. Default 32. Provides a delay from when the transmitter is activated to when the first character is sent.

**Attenuation** Adjust signal from 0db to -50db

#### Receiver



**Carrier frequency** Receive audio fq in hz. Maybe Locked.

**AFC** Select from None, Slow, Normal or Fast. Default Slow

**Demodulator** Select from Coherent. Default Coherent.

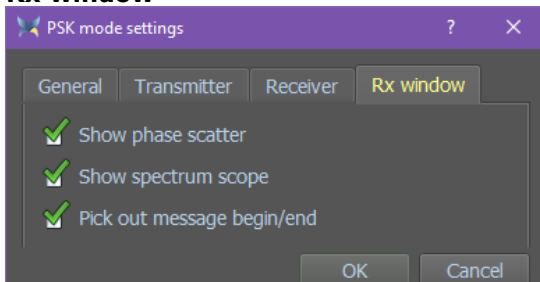
On Waterfall Click:

**Snap carrier frequency** When activated clicking on a signal will cause the frequency to be accurately found and maintained.

**Define baud rate** When activated with Snap carrier frequency an attempt is made to switch to the correct baud rate. This needs a fairly strong PSK signal.

**Clear Rx view**

#### Rx window



**Show phase scatter**

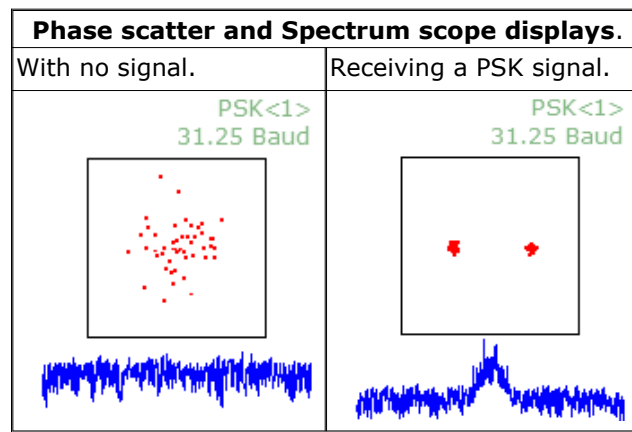
**Show spectrum scope**

**Pick out message begin/end**

Put SOM on the line before a message.

Put EOM on the line following the message.

The message is defined by the signal strength, which can be displayed on the Phase scatter diagram.



#### Status bar



PSK Status bar unique settings:

- 1 - Switch Snap on or off.
- 2 - Select Baud rate from 31.25, 62.5 or 125.

#### Receiving PSK

PSK31 signals display as two closely spaced parallel lines in the Spectrum Window. Tune in a PSK signal by pointing to it with the mouse and clicking the left mouse button. The text being sent by the station will then appear in the Receive Window.

**Transmitting PSK31** There are no special requirements for transmitting PSK modes.

**Power:** Because of the narrow bandwidth, PSK transmit power should be kept to a minimum. PSK31 is an excellent mode for QRP operations.

**Note:** PSK utilizes the full ascii character set, so normal useage is upper and lower case instead of all caps, and whatever punctuation you want. Callsigns are either upper and lower case or ALL CAPS. Both ways are acceptable, but an important consideration is that the lower case letters use fewer phase changes and are less likely to be garbled in bad conditions.

## RTTY

### RTTY Introduction

From the website of Richard B. Griffin, NB6Z

RTTY or RadioTeletype is a direct machine-to-machine communications mode using the Baudot (or Murray) code. This mode became popular with many amateurs when surplus TTY machines became available at a reasonable cost after World War II. These mechanical monsters provided a keyboard for Input and a paper roll for printed Output. They were also useful to help hold the house down in times of hurricane winds - they must weigh a ton. Video displays were still too exotic and expensive in those days. It was not until the mid 1970s that we began to see the Video Display come into more widespread use. (By the way, have you ever wondered why early Program Languages like BASIC use the command PRINT to display their output?)

When transmitting Morse Code, the transmitter is switched on and off to make the dits and dahs. When sending Teletype however the transmitter runs continuously, sending either of two frequencies conventionally known as Mark and Space (a reference to paper tape reception of telegraphy). The early pioneers found on-off keying was not all that successful for Teletype signals because of interference from static.

They experimented with FSK, or Frequency Shift Keying and found it performed much better. With FSK, the transmitter is shifted up in frequency every time a Mark is to be sent, reverting to the lower frequency for a Space. The amount of the shift is usually 170 Hz for Amateur Radio use although many commercial Teletype signals use other shifts, notably 425 Hz and 850 Hz. Many systems use AFSK or Audio Frequency Shift Keying. When this is sent, the transmitting station generates the Mark and Space audio tones and feeds them into the transmitter's microphone input. The result at the receiving end is that the same audio tones are heard and processed, whether the transmitting station used FSK or AFSK.

When listening to a teletype signal off air, you will soon get to recognize the familiar warble of Mark and Space tones. In the amateur shack the TTY machine is usually connected to an HF receiver or transceiver which the operator tunes so that the received audio is just the right pitch or audio frequency to trigger the demodulator's Mark and Space resonators.

If the receiver is slightly off the correct frequency the tones vary and the text becomes garbled or even lost altogether. To help the other station tune the receiver correctly, a RTTY operator can send a string of alternate R and Y characters RYRYRYRYRY. This pattern is chosen as it produces the most frequent and almost symmetrical alternation of Mark and Space tones, giving the receiving operator the best chance to tune the receiver before the "real" message starts. However, even if the signal is accurately tuned, the information can become garbled or completely lost due to interference, fading, or noise. Often, it is possible to make sense of the message even with parts missing, but RTTY is by NO means an error free mode!

I should point out that similar problems exist for other modes including Packet. While information can still fail to get through on the more sophisticated modes the Error Detecting capability of some, especially Packet and PACTOR, ensure that the operator will receive either accurate information or nothing at all. Usually, where "nothing at all" is received, the information will automatically be retransmitted when the radio is retuned, or the interference stops, (etc) and nothing is lost.

The Baudot code is a 5 bit code and those of you who are familiar with Binary Notation will know that the maximum number of values we can have with 5 bits is 32. That means that each unit of transmission, one keystroke if you like, can contain any one of 32 possible values. If you look up a table of Baudot codes you will see there are 32 values listed, one code for each letter of the alphabet plus a few other codes for other things such as a space and a Carriage Return. But, what if we want to send a number such as "9" or a question mark? These are not mentioned in that table because all 32 codes are already used.

The solution is rather similar to the Typewriter or Computer Keyboard where we have the Shift key to get various additional codes from the keyboard. Most keys will produce a different result if we hold down the Shift key as we type. Well, one of those original 32 codes is a special code known as FIGS (for Figures Shift). The convention is that when we want to send a number or some other special character such as a punctuation mark, we can do that by first transmitting a FIGS code.

Then instead of using that original table of 32 codes, we have a second table of codes to use, and that second table includes all ten numeric digits and various punctuation marks. Provided both sides of the conversation observe the convention, the sender can send a FIGS and start using the second table; the receiver will see the FIGS code and it too will interpret all data that follows from the second table.

With just 5 bits of data we then have almost 64 different codes we can send and receive. (I say almost because there is some duplication in the two tables, including a space and a Carriage Return but that is not important here). Even that many codes is not enough to handle all 26 letters of the alphabet in both UPPER and lower case, so RTTY systems always operate in upper case only.

If we wanted to type a big number (say "13579") we don't have to send FIGS before every digit. We send that code only once and the receiver then will take EVERYTHING we type from now as if it belongs in the second table. When we want to revert to the normal alphabetic table of codes we can send another special code, this one called LTRS (for Letters Shift). Then everything goes back to normal, using the original alphabetic table of codes.

Normally we don't have to concern ourselves with these FIGS and LTRS codes. Our computing equipment will take care of those things for us. We just type away and rely on the system to generate and send those codes when necessary.

As I mentioned earlier, it is quite possible to lose bits here and there when receiving a RTTY signal, whether it be because of fading, interference, frequency drift, or whatever. One of the big problems with lost data is the possible loss of a FIGS or LTRS code! Say we had sent "13579" and then typed "HAPPY BIRTHDAY". Our equipment would have sent a LTRS code before the first "H" but what if the receiver did not copy the LTRS code we sent? Can you imagine what happens? As far as the receiver is concerned we are still sending numbers or other codes from the numeric table! So our "HAPPY BIRTHDAY" is going to come out looking something like "#-006 ?845#-\$-6". And EVERYTHING we type from then on is going to look just as strange until we happen to send another LTRS code later. It is for this reason that many systems include an option to "Un-shift on space". If you have a multi mode TNC capable of handling RTTY, you will probably have this option in your TNC. If that option is ON then your receiving system will imply a LTRS code every time it receives a space. So if you seem to be copying lots of funny numbers from a strong, well tuned signal, try setting that option ON.

We can overcome some of these problems by using ASCII instead of using the Baudot code. With ASCII we can have 128 different codes so we do not need the FIGS/LTRS codes. All Personal Computers use ASCII as their native "language" so it would be a reasonable thing to use. Although not part of the defined ASCII standard, it has become an almost de-facto standard in the computer world that an additional 128 characters are available, often called Extended ASCII. But, despite these benefits, Baudot continues to rule the airwaves for Amateur and Commercial Teletype transmissions.

Today, RTTY is still a popular mode especially on the HF bands, and the advent of the "Glass Terminal", first the Dumb Terminal and now the Personal Computer, has brought this mode to even more operators the world over. Many specialized RTTY systems were developed for the Amateur enthusiasts but have been superseded now by the Personal Computer with one of the Multi Mode TNCs, which handle RTTY, and many other modes besides.

The latest Computerized RTTY equipment generally allows us to use the mode better, quieter, more efficiently, using less power and occupying less space than the old TTY machines, but the limitations of the mode remain.

## RTTY Operation

MixW4 will have the ability to send RTTY signals by two different methods:

AFSK - MixW4 generates baud rate/shift frequencies.

FSK - The transceiver generates baud rate/shift frequencies. **FSK is not yet supported**

**Note: not all transceivers support FSK operation.**

### MixW4 settings

#### Cat

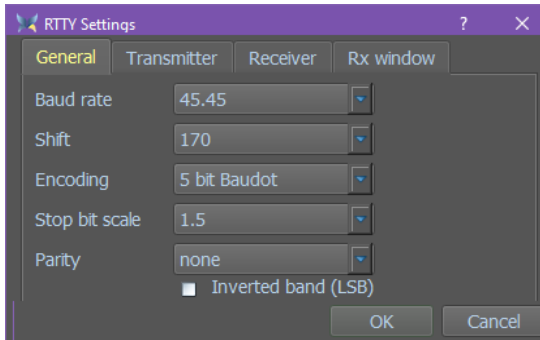
As only AFSK transmission is possible now your transceiver should be configured to operate in the same mode as other digital modes (PSK, FT8 Olivia etc).

The new Band map and CAT settings should make the correct mode selection in the transceiver automatic.

## RTTY Mode settings

Select RTTY mode. Select mode settings by clicking the Settings control on the mode status bar. This brings up the following selection screen:

### General



**Baud rate** Select from 22.5, 45.45, 50, 75, 100, 150, 200 or 300. Default 45.45.

**Shift** Select from 85, 100, 170, 450 or 800. Default 170.

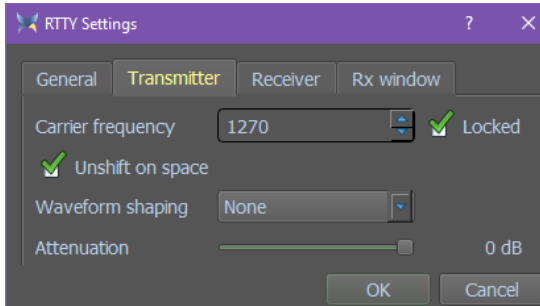
**Encoding** Select from 5 bit Baudot, 7 bit ASCII or 8 bit ASCII. Default 5 bit Baudot.

**Stop bit scale** Select from 1, 1.5 or 2. Default 1.5

**Parity** Select from even, odd or none. Default none.

**Inverted band (LSB)** Select the other sideband.

### Transmitter



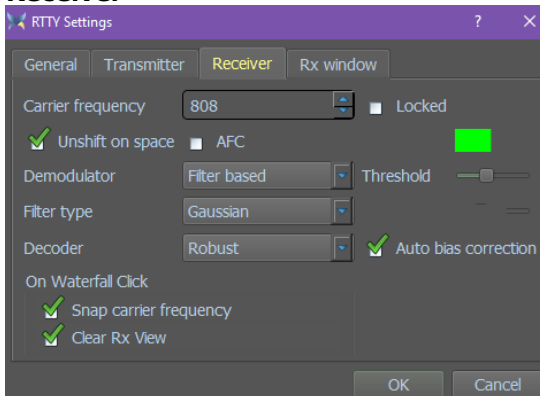
**Carrier frequency** Transmit audio fq in hz. Maybe **Locked**.

**Unshift on space** Switch to letters whenever a space is detected.

**Waveform shaping** Select from None, Amplitude shaping or Frequency shaping. Default None

**Attenuation** Adjust signal from 0db to -50db

### Receiver



**Carrier frequency** Receive audio fq in hz. Maybe **Locked**.

**Unshift on space** Use letters when a space is detected.

**AFC** Automatic Frequency Control. Keep the waterfall cursor on the signal.

**Demodulator** Select from Frequency detector, Filter based or Combined. Default Filter based.

**Filter type** Select from Sinc, Gaussian or Raised Cos. Default Gaussian.

**Decoder** Select from Robust, Modest, Precise or Pure. Default Robust.

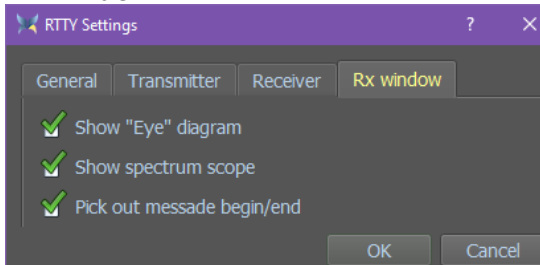
**On Waterfall Click:**

**Snap carrier frequency** When ticked clicking on a signal will cause the frequency to be accurately found and maintained.

**Clear Rx view**

The **Green bar** is a signal strength indicator. **Auto bias correction** information to follow.

### Rx window



**Show "Eye" diagram**

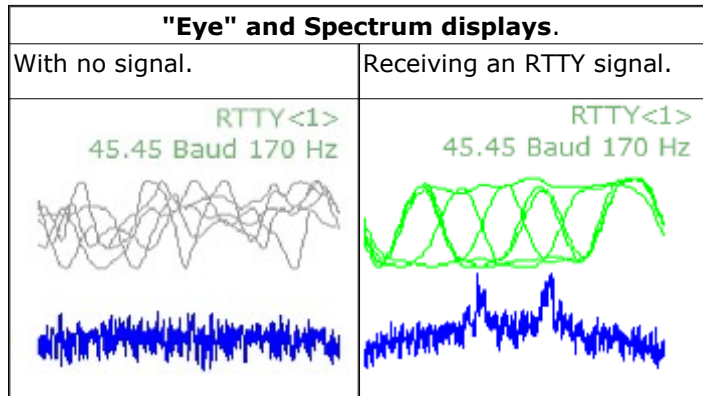
**Show spectrum scope**

**Pick out message begin/end**

Put SOM on the line before a message.

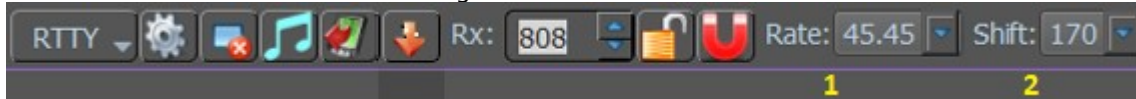
Put EOM on the line following the message.

The message is defined by the signal strength, which can be displayed on the "Eye" diagram.



### Status bar

The RTTY status bar allows the setting of the baud rate and shift in Hz.



Status bar unique settings:

- 1 Baud rate.
- 2 Shift (Hz).

### Receiving RTTY

RTTY signals display as two parallel lines usually 170Hz apart. Tune in a RTTY signal by pointing right in the center of the two tracks with the mouse and clicking the left mouse button. The text being sent by the station will then appear in the Receive Window.

### Transmitting RTTY

To transmit to a station, first tune it in as indicated above. Type your outgoing text in the Transmit Window. Press the Send button under the Tx window and the text will be transmitted. You can continue to type and that text will also be transmitted. As it is being transmitted, text in the transmit window will also appear in the Receive Window. To stop transmitting press the Stop button under the Tx window. Pressing ESC will abort transmission and return MixW to receive mode but unsent characters typed will not be transmitted.

**Power:** RTTY uses a wide bandwidth and so it will require relatively high power compared to modes such as CW and PSK31. Never use more power than you need for any given situation, however.

**Note:** RTTY utilizes a limited character set, using UPPER CASE LETTERS ONLY. MixW will automatically convert lower case letters to upper case. You will also notice that not all punctuation marks are supported, although most of them are. The following characters are supported: - ( ) \$ ! " / : ? .


## RTTYM

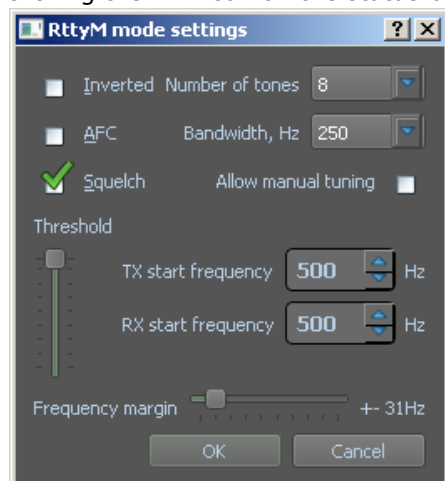
### RTTYM Introduction

RTTYM is a development from Contesti mode with further reduced facilities and robustness created by Nick Fedoseev (UT2UZ).

RTTYM uses a character set similar to RTTY.

### RTTYM Operation

RTTYM is a version of MFSK, and in MixW the operating procedures are the same as for MFSK with the exception of certain options which can be set in the Mode settings dialog box. Select RTTYM mode and by clicking the  icon on the status bar you will see the following dialog box:



**Inverted** causes the signal to be inverted.

**Number of tones** selects from 8 values between 2 and 256

**AFC** assists tuning and tracking the RTTYM signal.

**Bandwidth, Hz** selects from 5 values between 125 and 2000

**Squelch** and **Threshold** can be adjusted to your preferences.

**Allow manual tuning** is permanently enabled.

**Tx/Rx start frequencies** are the signal **low** frequency settings.

**Frequency margin** alters the frequency range signals are decoded.

The RTTYM status bar allows the setting of the Tx/Rx centre frequency, number of tones and bandwidth.



Status bar unique settings:

- 1 The Tx/Rx **Centre** frequency.
- 2 Number of tones.
- 3 Bandwidth (Hz).

The signals seen on the waterfall are practically identical to Olivia and Contesti signals. As with all digital modes, after a little experience the user will be able to identify the various formats visually in the waterfall.

### Finding and Tuning RTTYM Signals.

RTTYM under MixW is operated exactly like any other MFSK mode, by clicking the desired centre frequency on the waterfall or spectrum display.<

Frequencies currently being used for RTTYM seem to be:

- For 125/250/500 bandwidth just above the BPSK63/125 frequencies
- 40 meters, 7072-7074
- 30 meters, 10134-10139
- 20 meters, 14100-14112

The best combination for calling CQ is probably 500 Hz, 8 Tones. However a common practice now is to call in whatever mode the operator wants to work in. Be carefull using the 1000 Hz width, and particularly changing from 500 Hz, to 1000 Hz, that you do not cause interference to other users.

RTTYM is not as popular on the bands as Contesti or Olivia.

## Appendices

### Earth map

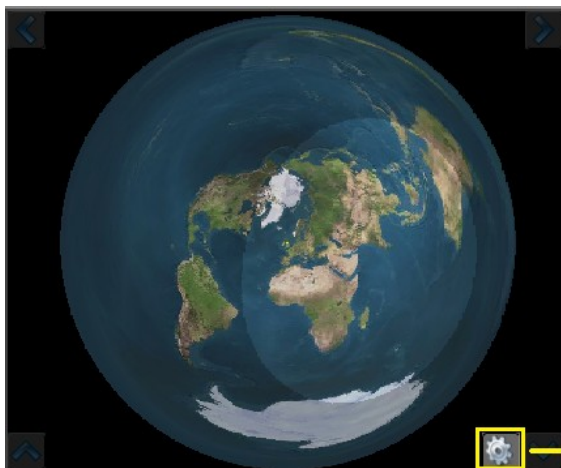
The Earth map display has two functions:

- To display location information for a particular call.
- To display the locations of stations displayed by the DXCluster.

These functions maybe combined depending on your settings of the DXCluster.

The Earth map is centred on the data input to Personal data. If a Maidenhead locator is present this is used otherwise the Latitude and Longitude. If neither are present the map is centred on the point where the Equator and Greenwich meridian cross (latitude 0 longitude 0).

#### Earth map



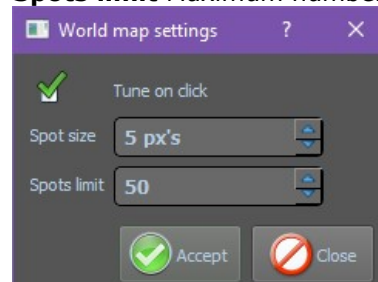
#### Settings

These settings are for use with the DX Cluster.

**Tune on click** if ticked displays call details from DXCluster selection

**Spot size** The size of each spot box on the map.

**Spots limit** Maximum number of spots to display.



## Calls being displayed from the DXCluster



Hover the mouse over a square and the Callsign and Country are displayed.

The spot size on this display is 20px. A smaller spot size of about 5px looks less cluttered.

The colours of the squares indicate the log status of the callsign as defined in the QSO state [Text settings](#) colour.

## Displaying selected station information



The call has either been selected from the DXCluster by clicking on an entry or entering a call in the new QSO log.

The following information is displayed:

- The call
- Country prefix
- Continent, CQ Zone, ITU zone
- Short path direction for a steerable antenna.
- A red line indicating the short path direction.

On this picture the spot size has been reduced to 4px.

## File Descriptions

### ADIF Files

Files with a suffix .adi should be files created using the Amateur Data Interchange Format.

See [The independent ADIF site](#) for up to date information.

MixW4 writes a 5 line header file indicating the version of the ADIF file specification used in the creation of this file.

**Note: ADI entries will not be generated for QSOs where the QSO frequency is not within the bounds of any band frequencies in the Band map.**

### calls.dat file

The calls.dat file is used in conjunction with the [cty.dat](#) and [pfx.dat](#) files to assist MixW in identifying a country or region

The file consists of single lines of data. The data comprising two colon (:) separated fields:

UT2UZ: US5U

The left field is a complete callsign and the right field is a prefix for cross reference in the cty.dat or pfx.dat files.

In the above example the call UT2UZ (normally Kiev is shown in the call information below the log) is now located in the US5U call area referenced from the pfx.dat file (Kyjivs'ka oblast[KO] will be shown instead). Lines in the file starting with a semi-colon (;) are treated as comments.

### cty.dat File

The cty.dat file is used for Contests to assist in the generation of country multipliers from callsigns. MixW also uses the entries to cross reference into the [pfx.dat](#) file to obtain possible further country information.

Each entry consists of multiple lines of data, the first contains 8 colon separated fields, the second and



subsequent lines, are comma separated fields. The further data lines must start with a space or tab character and the last line is terminated by a semi-colon.

The eight fields of the first line are:

- Country name
- CQ Zone
- ITU Zone
- Two letter continent
- Latitude: (-ve is South)
- Longitude: (-ve is East. This is the opposite of the data in Personal Data)
- Time difference from UTC
- Primary country prefix

The subsequent lines are any of:

- Further prefixes associated with this country
- A Prefix or partial call followed by a figure in round brackets. This changes the CQ Zone for this prefix or partial call.
- A Prefix or partial call followed by a figure in square brackets. This changes the ITU Zone for this prefix or partial call.
- A prefix or partial call with both round and square bracketed figures. This changes both zones.
- A complete callsign preceded by the equals sign indicating this call is to be associated with this country.

This file is regularly updated to reflect country changes, individual call location changes and other special event callsigns.

The version of `cty.dat` installed and in use by MixW4 can be identified by entering VERSION as the current QSO callsign. The country that is displayed changes for each version.

A release note with the `cty.dat` file indicates which country will be identified by the VERSION callsign.

The latest version of the file and more information can be found at:

<http://www.country-files.com/>

There is also a big copy of this file. For more information on the big `cty.dat` file see:

<http://www.country-files.com/bigcty/index.htm>

## **.json files**

These files utilise the *JavaScript Object Notation* format.

See <https://www.json.org> for further information.

The `.json` file is a variable format although it should be easily readable.

## **.layout files**

These are the files created by MixW4 after a layout has been saved using the [Main menu](#) Save screen layout. They are saved in the `{data_root}` folder.

## **Multipan.db3**

This file contains a lot of the data used to configure and operate MixW4.

It is an SQLite format database file containing a number of tables.

These tables contain:

- A modified form of the `cty.dat` and `pfx.dat` files.
- The users QSO log.
- The bandmap file.
- MixW4 version information.
- Some of the data used to configure MixW4 at start up.
- Mode/sub-Mode translation.

## **pfx.dat**

The `pfx.dat` file provides further information about the current QSO call sign prefix. This information supplements the information in [cty.dat](#).

The file format is similar to the `cty.dat` format.

Each entry consists of multiple lines of data, the first contains 8 colon/space separated fields, the second and subsequent lines, are comma separated further data pertaining to the country prefix. The further data lines must start with a space or tab characters and the last line is terminated by a semi-colon.

The eight fields of the first line are:

- Additional Name:
- CQ Zone:
- ITU Zone:
- Two letter continent:
- Latitude: (-ve is South)
- Longitude: (-ve is East. This is the opposite of the data in Personal Data)
- Time difference from UTC:
- Primary country prefix:

The subsequent lines are callsign or partial callsigns to be associated with the first line data.

The partial callsigns will contain wildcards. ? for a single character and \* to the end of the call

This file is delivered with the MixW software.

## Macro List

### Text macros

<MYCALL>	Insert your callsign as configured in Personal Data
<MYNAME>	Insert your name as configured in Personal Data
<MYQTH>	Insert your QTH as configured in Personal Data
<MYWWLOC>	Insert your locator as configured in Personal Data
<MYEQUIPT>	Insert your equipment as configured in Personal Data
<CALL>	Insert the callsign of other station as in log
<ABSGRABCALL>	Get next call from the received data. Overwrites any current selection
<GRABCALL>	Get next call from the received data. Only gets the call if the Call field is empty
<NAME>	Insert the name of the other station operator as in log
<QTH>	Insert the QTH of the other station as in log
<WWLOC>	Insert the other station locator
<RSTS>	Insert sent RST
<RSTR>	Insert received RST
<NRS>	Insert Exchange to send
<NRR>	Insert Exchange received
<PREVCALL>	Insert Previous Call
<PREVRSTS>	Insert Previous sent RST
<PREVRSTR>	Insert Previous received RST
<PREVNRS>	Insert Previous Exchange to send
<PREVNRR>	Insert Previous Exchange received
<VER>	Insert Version Number
<TIME>	Insert the current UTC time
<DATE>	Insert the current date
<QSOBEFOREDATE>	Insert previous QSO for this band and mode date
<QSOBEFORETIME>	Insert previous QSO for this band and mode time
<GA>	Insert GM GA or GE depending on time at Call station
<MODE>	Insert current mode
<MHZ>	Insert current frequency in Mhz
<KHZ>	Insert current frequency in Khz
<QSONR>	Insert this QSO number
<QSONR:MODE>	Insert this mode QSO number
<QSONR:BAND>	Insert this band QSO number
<NOTES>	Insert the Notes field as in the log

<CR>	Insert Carriage Return
<CRLF>	Insert Carriage Return then Linefeed
<LF>	Insert Line feed
<WPM>	Display CW speed in WPM
<CPM>	Display CW speed in CPM
<FILE>	Insert contents of file (opens file selection dialogue)
<FILE:filename>	Insert contents of filename. Filename must be a full path to the file.

### **Program control macros**

<TX>	Switch to TX when encountered in the data stream
<RX>	Switch to RX when encountered in the TX data stream
<RXANDCLEAR>	Switch to RX and clear TX window
<FIXSTARTTIME>	Set current time as QSO start time in log
<MODE:>	Set mode to MixW mode
<CLEARRXWINDOW>	Clear RX window
<CLEARRX>	Clear RX window
<CLEARTXWINDOW>	Clear TX window
<CLEARTX>	Clear TX window
<SAVEQSO>	Save QSO data. Make sure this macro comes before any 'Clear' macros
<CLEARQSO>	Erase the data in the current QSO line
<SENDEQSL>	Send current QSO to eQSL. Prompts for password. This macro must come before a <SAVEQSO> or any 'Clear' macros.
<SENDEQSLNP>	Send current QSO to eQSL with no prompt. Same restrictions as <SENDEQSL>
<TXCLEAR>	Clear TX window
<FQ:khz>	Set the transceiver frequency (use +/- for relative change)
<AUTOQCQ:pause_secs>	Start auto CQ, ESC aborts
<ASAUTOQCQ:pause_secs>	Autocq_text - start auto CQ with text, ESC aborts
<MODESETTINGS>	Displays mode settings dialogue box
<LOCKTX>	Lock the transmit frequency
<LOCKRX>	Lock the receive frequency
<UNLOCKTX>	Unlock the transmit frequency
<UNLOCKRX>	Unlock the receive frequency
<CURSOR:n>	Move the Cursor to log input position n. Values of n: 1 Call, 2 Name, 3 QTH, 4 RST-S, 5 RST-R 6 Fq, 7 Notes, 8 Mode, 9 NRR, 10 Locator 11 IOTA, 12 ???, 13 QSL via
<CURSOR:TX>	Move the Cursor to the TX window

<AUDIOFQ:fq_in_Hz>	Set the audio frequency (use +/- for relative change)
<SHIFTTTOAUDIOFQ:fq_in_Hz>	Align the signal to audio frequency
<AFCON>	Switch AFC ON.
<AFCOFF>	Switch AFC OFF
<SENDSPOT>	Send spot
<SAVE_WAV>	Save last 30 seconds into WAV file
<PLG:plugin_name>	Run plugin_name plugin

#### **Cat control macros**

<CATCMD:text_cmd>	Send an alpha/numeric command to the CAT port
<CATCMDHEX:hex_cmd>	Send hex command to the CAT port

#### **CW Mode macros**

<WPM:n>	Set CW speed in WPM (use +/- for relative change)
<CPM:n>	Set CW speed in CPM (use +/- for relative change)

**There is a delay after the speed change macros have been executed before the updated speed is used.**

#### **Contesti, Olivia & RTTY Mode macros**

<SET BW:bandwidth>	Sets the bandwidth
<SET TONES:tone>	Sets the tone

#### **PSK&RTTY Mode macros**

<BAUDRATE:baudrate>	Sets the baudrate
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#### **RTTY Mode macro**

<SHIFT:shift>	Sets the shift frequency
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**Contest macros.** See [Contesting](#) section for more information.

<S/P>	Toggles between search and pounce and run mode.
<SP0>	Sets search and pounce mode off (run mode on).
<SP1>	Sets search and pounce mode on.
<SP:0>	Sets search and pounce mode off (run mode on).
<SP:1>	Sets search and pounce mode on.
<OnSP0>	Sets search and pounce mode off (run mode on).
<OnSP1>	Sets search and pounce mode on.
<INT>	Action depends on S&P or Run mode and content of CALL and NRR fields
<INTQRL>	Called in S&P mode when Call is empty
<INTDE>	Called in S&P mode with a new call but NRR empty
<INTQSL>	Called in S&P mode with a new call and NRR complete
<INTCQ>	Called in Run mode when Call is empty
<INTGA>	Called in Run mode with a new call but NRR empty
<INTQB4>	Called in Run mode with a previous QSO call

<INTQRZ>	Called in Run mode with new call and NRR complete
<INTCALLQRZ>	Called in Run mode with new call and NRR complete
<INTAGNCALL>	Request call sign again
<INTAGNNR>	Request exchange again
<ACALL>	Start transmission with a partial call. The Call maybe completed during transmission. Whatever is in the Call at the moment of action of this macro is displayed.  Not suitable for the higher speed modes
<CCALL>	Start transmission with a partial call. The Call maybe completed during transmission. If the Call is not completed no data is displayed.  Not suitable for the higher speed modes
<CONTESTCMD:text_json>	JSON command in contest mode
<CONTESTCMDF>	Choose JSON file in contest mode
<CONTESTCMDF:file_name>	Open JSON file in contest mode

## DX Cluster

### Introduction

MixW has a built in DX Cluster window, which can obtain data from either a Telnet or Internet DX Cluster and the Reverse Beacon network. To activate this window select [Show/Hide Views](#) from the Main menus items and select DX Cluster.

This brings up the following window:

Call	Spotter	Fq	UTC	Info	Country
WU7X	OH1LW:	10,13	07:52	FT8	United States
ZM1A	ON7PQ	21,00	07:52		New Zealand
4L2M	W3LPL	14,00	07:52	Heard	Georgia
RQ9F/P	RU9F	10,12	07:52	tnx QS	European Russia
AD1C	OH1LW:	10,13	07:52	FT8	United States
RU1A	N7TR ...	14,00	07:52	19 dB	European Russia
UP2L	IK3STG	28,01	07:52	26 dB	Kazakhstan
UA1ODY/M	LZ4AE .	18,06	07:52	2 dB 2	European Russia

The colour column at the left side of the display shows the status of the call with respect to the current log.

These colours can be selected using the colours as selected in the [Cluster Display menu](#).

The text colours are selected to show the source of the information.

Blue shows the source is the Reverse Beacon Network and Red the DX Cluster. These colours can be selected, along with entry background colours, by using the Cluster Display menu

### DX Cluster display Toolbar

At the base of the DX Cluster display is a small toolbar with 7 Icons on it:



Send a Spot to the Cluster.



Immediately refresh the cluster data display.



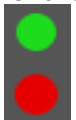
Brings up the cluster settings window.



Refresh in 11 sec's

Shows the time to the next cluster data refresh.

The following 3 items have their colours selected using the Cluster Display menu.



Show/Hide New call spots.



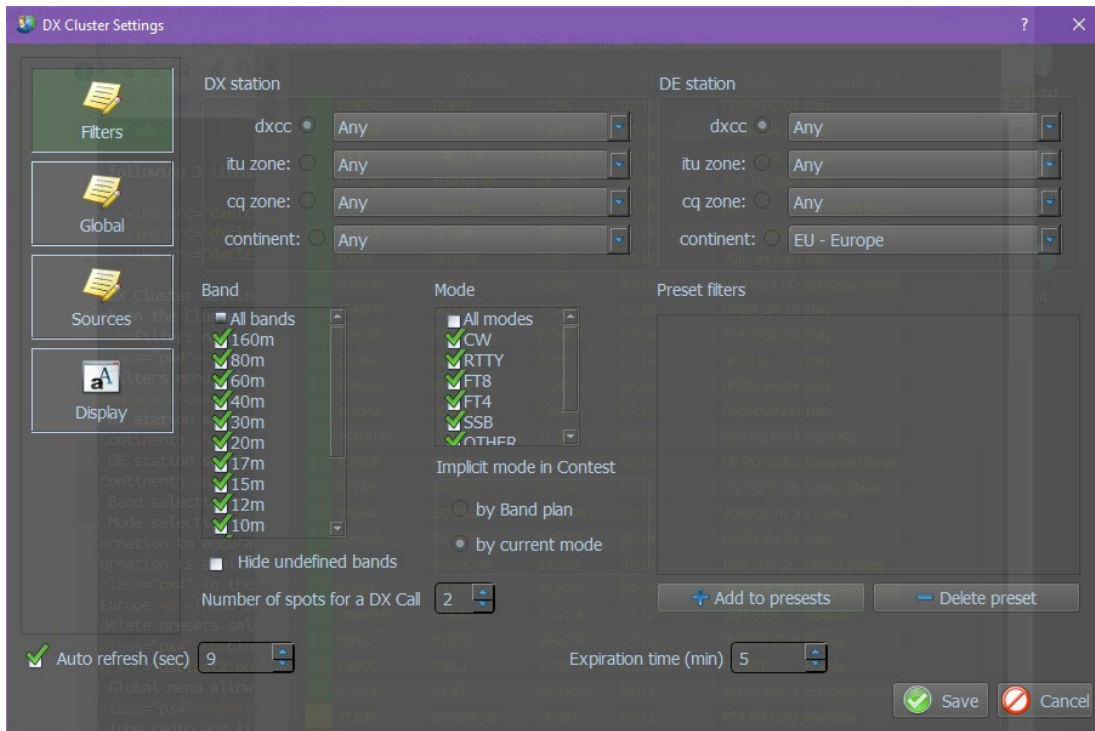
Show/Hide QSO before spots.



Show/Hide unknown country spots.

## DX Cluster Settings

Click on the Cluster toolbar gear wheel icon to display the cluster settings. **Filters menu**



The Filters menu allows the user to select what is to be displayed in the cluster window.

The DX station section allows a choice of where the spotted station is located (DXCC, CQ/ITU zone or Continent).

The DE station section allows a choice of where the spotter station is located (DXCC, CQ/ITU zone or Continent).

The Band selection selects the band(s) to be displayed.

The Mode selection selects which mode(s) to display. The Mode display relies on data from the Information to accurately display the stations. It appears to default to CW if no mode information is available.

In the screen above the DX cluster will display all calls in all modes heard in Europe.

These settings, along with the bands and modes can be added to the presets. To delete presets select the group and click Delete presets.

**Number of spots for a DX Call:** Number of times a DX Call from the Reverse Beacon Network (RBN) will appear in the Cluster display.

### Implicit mode in Contest.

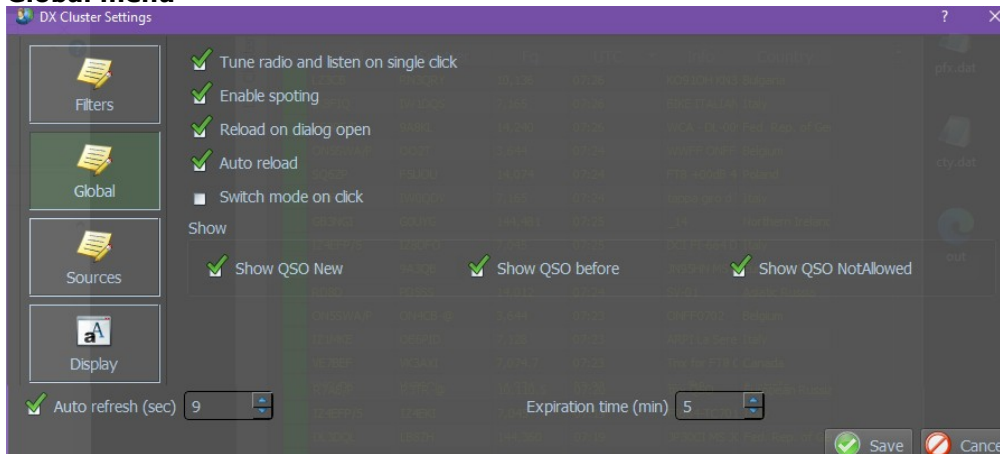
#### by Band plan

Displays all calls that are valid according to the band plan.

#### by current mode

Displays all calls that are valid according to the mode.

## Global menu

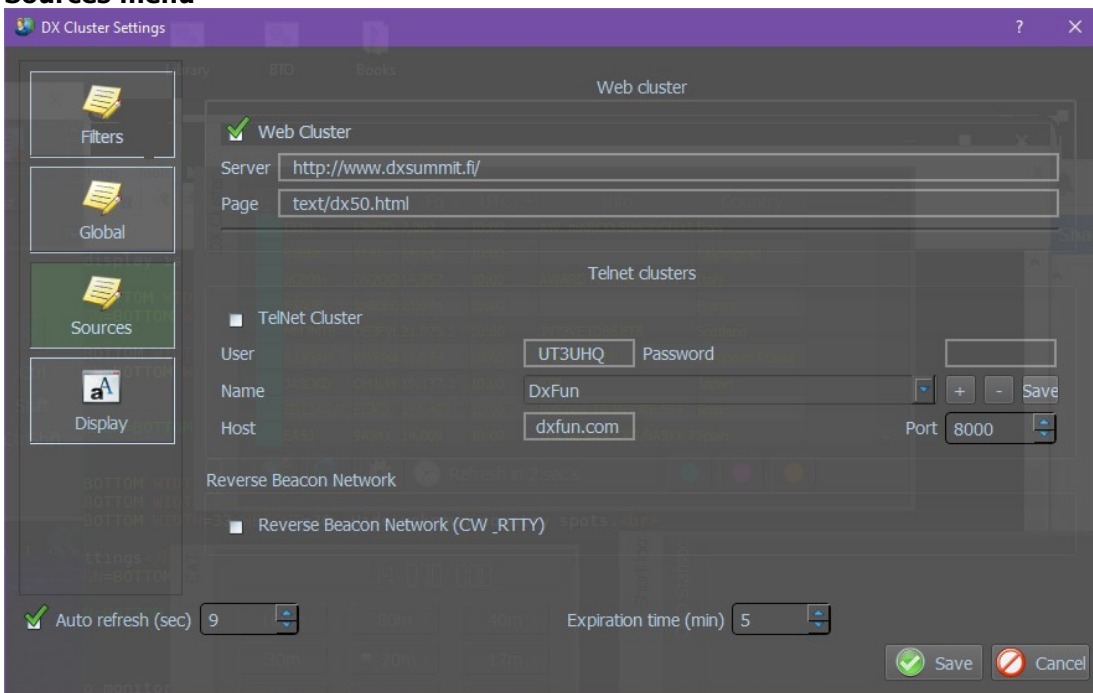


The Global menu allows the selection of general cluster monitoring settings.

Tune radio and listen on single click A single click on a Cluster table entry will tune the radio to the station

- Enable spotting Allow station information to be sent via the Cluster interface
  - Reload on Dialog open Reload the cluster data when the Cluster starts
  - Auto reload Automatically retrieve the DX data according to the Auto refresh seconds setting.
  - Switch mode on click Set the transceiver to the spotted station's mode.
- The following 3 controls are linked to the Show/Hide controls in the Cluster display toolbar.
- Show QSO new This is a new country.
  - Show QSO before A QSO with this country is already logged.
  - Show QSO not allowed The call sign is not from a recognised country.

### Sources menu



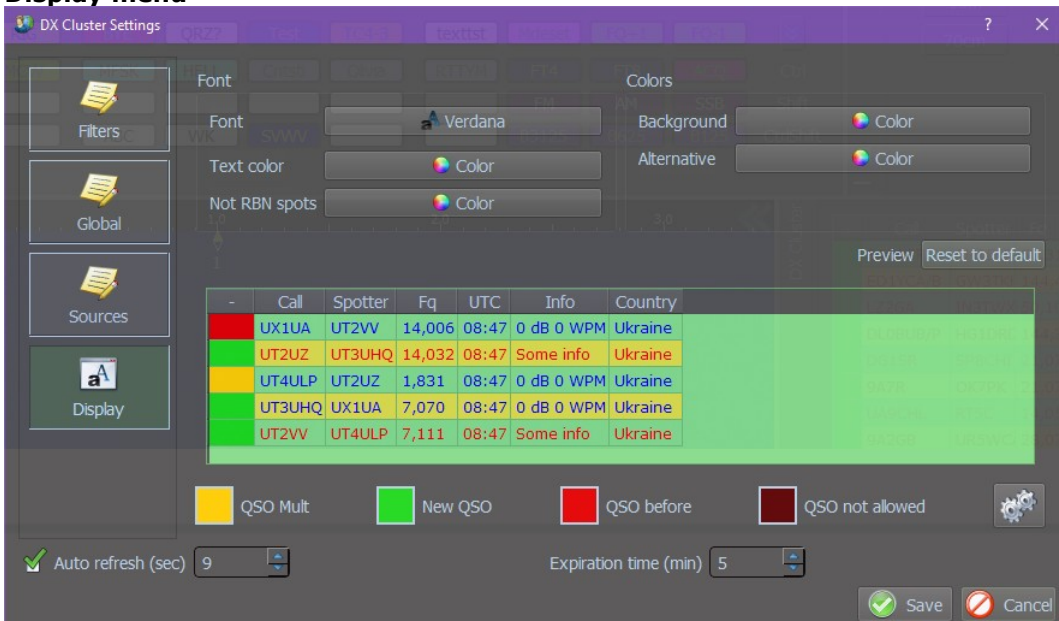
Sources as delivered

Web Cluster server:  
<http://www.dxsummit.fi/>  
 Page: text/dx50.html

Telnet Cluster Host:  
 dxfun.com

Reverse Beacon Network (CW, RTTY)

### Display menu



The 6 choices available from this menu are:

- Font** - Select a font and size. The display characteristics are fixed.
- Text color** - The color that RBN spots are displayed with.

**Not RBN spots** - The text color of all other cluster entries.

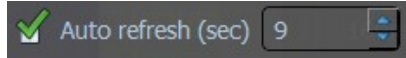
**Background** and **Alternative** allow a two striped display for ease of viewing.



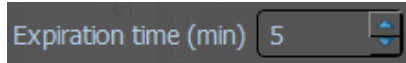
selects the [Text settings](#) menu. This will allow you to select the colours for:

- QSO Mult**
- New QSO**
- QSO Before**
- QSO not allowed**

The following two controls are shown on all four menu screens.



Tick the **Auto refresh** control and set the adjacent time control to the number of seconds between refreshes.



Set the **Expiration time** to the number of minutes you want the information retained.

If Auto refresh is not ticked the DXCluster will be stopped.



## KiwiSDR


### Introduction

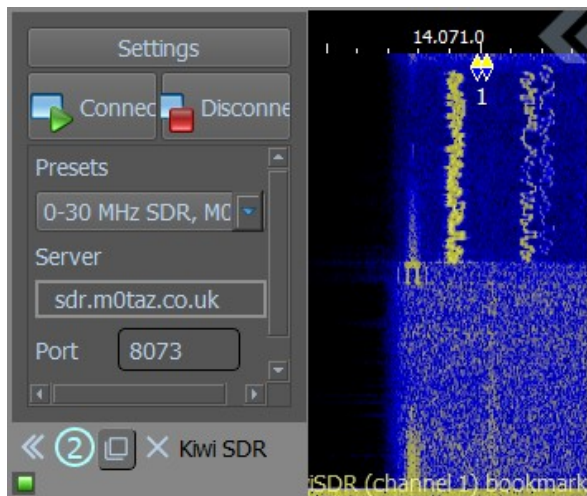
KiwiSDR is a wideband RX only HF software defined radio (SDR), covering 10KHz to 30MHz, the output of which is made available on the internet.

A number of Hams have created their own KiwiSDR stations each of which have up to 4 channels with its own audio and waterfall channels.

MixW has a KiwiSDR module that allows a user to connect to an unused channel of a KiwiSDR station and display the output on a separate waterfall display.



To start KiwiSDR click on the  icon. This brings up the Server selection window.



Settings - go to Settings Window.

Connect/Disconnect - Controls for action on selected Server.

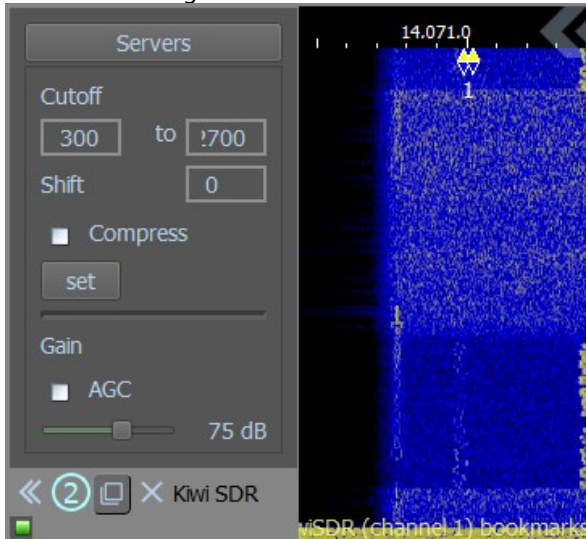
Presets: - Drop down list of available KiwiSDR servers.

Server: - Selected KiwiSDR server.

Port: - Port number for server connection.



## KiwiSDR settings window



Servers - go to Servers window.

Cutoff - Frequency range for display.

Shift - Difference between MixW4 and KiwiSDR waterfall frequencies in Hz.

Compress - Compress Cutoff.

Gain - Change between Automatic and Manual (using the slider) AGC regulation.

## KiwiSDR Control bar



Control bar when docked.

- Expand KiwiSDR Waterfall. Arrows reverse and Waterfall now retracts.
- Waterfall number.
- Waterfall dock/undock indicator and control.
- Close KiwiSDR session.

KiwiSDR status:

- Server not selected yet.
- Connection in progress.
- KiwiSDR connected to the server.
- No connection to the server.

No connection to the server can be caused by more than one problem. A message:

**Host not found**

is displayed to the left of the [Receive status bar](#) if the server cannot be contacted.

This could be caused by an a listed server having an incorrect address in the table or the server being physically disconnected from the internet.

The message will not be displayed if the connect fail is caused by the server rejecting the connection for any reason.

## Using KiwiSDR

Start KiwiSDR and select a server from the Presets drop down list. This server name should appear in the Server box. Change the Port number if this server does not use Port 8073.

Click on the Connect control. The Kiwi SDR status will go to green once a connection is established.

The KiwiSDR waterfall must now be adjusted, in a similar manner to the main [waterfall](#), for best waterfall display.

Click on a signal in the KiwiSDR waterfall and the RX cursor positions on it. When the correct mode is selected for the RX window signal decode will occur.

**To get the best for your needs using KiwiSDR - experiment.**

## Resizing Windows

MixW4 display is a main window with a number of sub-windows. These windows are docked with the main window at first start. From time to time users may want to customize their windows layout. This could lead to windows being resized and/or repositioned.

Each window that can be resized consists of the following controls.



Window title

When the window is not docked the background changes colour.

Disable dock or Allow Dock

Hide Window



Click on this control to start the resizing process for this window.

The icon will change to a single square.

Position the mouse cursor just below the window title, hold the left mouse button down and drag the window away from its docked position. As the window moves the title bar background will change to a light grey colour.

The window is now ready for resizing.

Use the mouse to manipulate the borders to your required size.



To redock the window click on the single square control. This will now revert to its docked state.

Using the mouse move the window to its desired position.

A blank area will appear in the main MixW4 window indicating where the docking will take place.

Release the mouse button and the window will slide into place.

There maybe difficulty in getting the window to position exactly as required.

Try undocking the window again and moving it so part of the window is outside the main window then sliding it in.

You may find a compromise has to be reached.

**These procedures need practise and patience to get the desired result.**

### Hide control.

Clicking on the Hide control will remove that window from the MixW4 main window.

To restore the window to the display select the Main menu Show/Hide Windows item and click on the item you want to restore.

## Registration

### Check Registration

For MixW4 registration you will need to have been registered with RigExpert Ukraine (this should happen when you have purchased a copy of MixW4). To check your registration go to

<http://www.mixw.net/misc/regcust/check.php>



### Am I registered with MixW?

Here you may check and register desired version of MixW software

Enter your CALLSIGN:

Fill in callsign field

[Click here to report registration problems](#)

Fill in your callsign and click Check.

### Registration

To complete registration you must be connected to the internet.

Having completed your registration check select Personal data from the Settings - Config data menu.

The screenshot shows a 'Config Dialog' window with the following fields and options:

- Call:
- QTH:
- Name:
- Equipments:
- Registration: <UNREGISTERED>
- State:
- Cnty:
- IOTA:
- Locator:
- Longitude:
- Latitude:
- Buttons:

The minimum data you have to enter and Save to achieve registration is your callsign.

### Registered or Unregistered?

There are 3 methods of showing if you are registered or unregistered.

#### The title of the main MixW4 window:



#### The Config dialog About screen:



### The Config dialog Personal data screen:

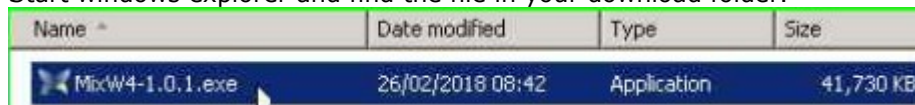


## Unblocking files.

Previous releases of MixW have sometimes needed files to be unblocked before the installation would work correctly. MixW4 does not seem to have these limitations but the following information is included in case a file is found to need unblocking.

To check if a file is blocked and then unblock it if necessary.

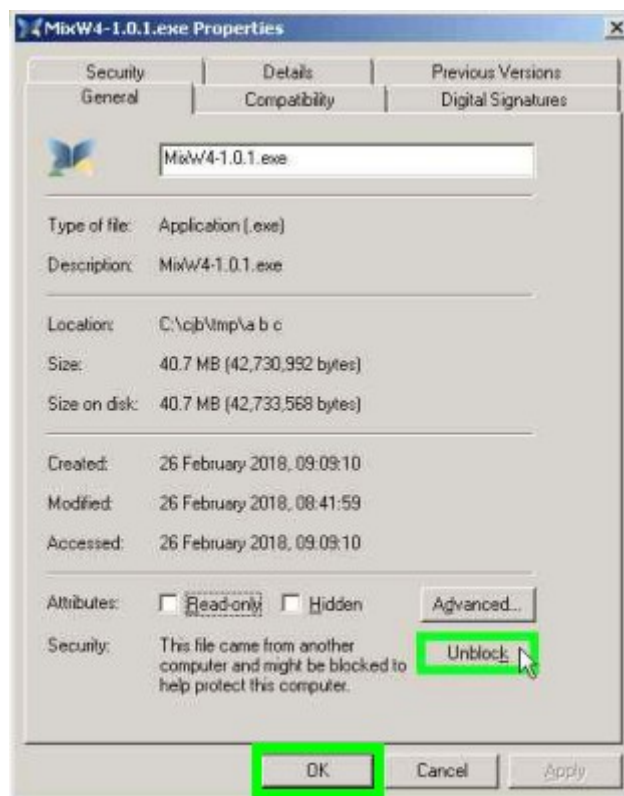
Start windows explorer and find the file in your download folder.



Select the file and right click.



Left click on Properties.



If the button Unblock is visible left click on it.

Finally click OK.

## Uninstall MixW4

When MixW4 is uninstalled the data files are not deleted, only the program files.

In the Installation section I have made use of this information to clarify some possible actions and to try to prevent 'Missing Files', which has happened during the installation of previous releases.

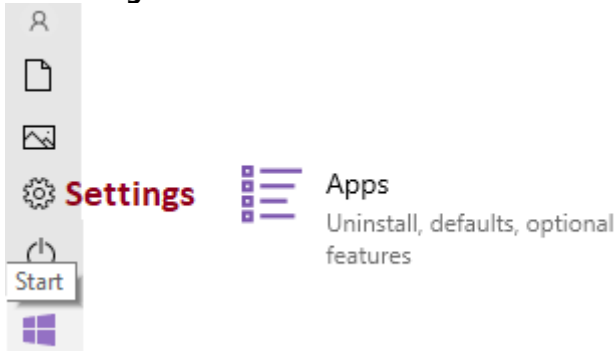
For this illustration I have used my own installation parameters.

I always create a new folder for a new version.

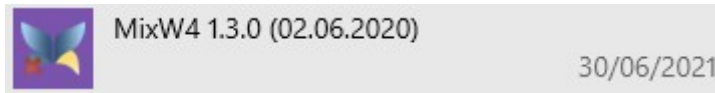
I sub-divide this into folder *MixW4p* for program files and *MixW4d* for data files.

In this example v4130 is the June 2020 release and v4140 is the 29-May-2021 release.

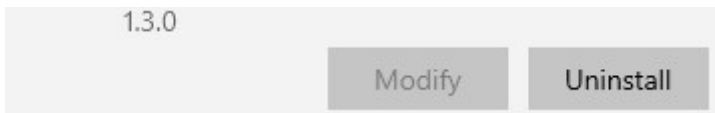
**Activating uninstall - 1.**



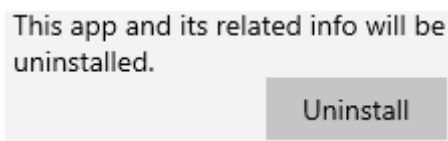
Left click on Start. Slide the mouse to Settings and left click.  
When the Settings window appears left click on Apps.



Use the slider to find the MixW4 entry (there should only be one).  
Left click on the entry.



This window is now displayed below the MixW4 identifying window.  
Click on Uninstall in this window.



Click on Uninstall in this window.  
Go down to the Common route.

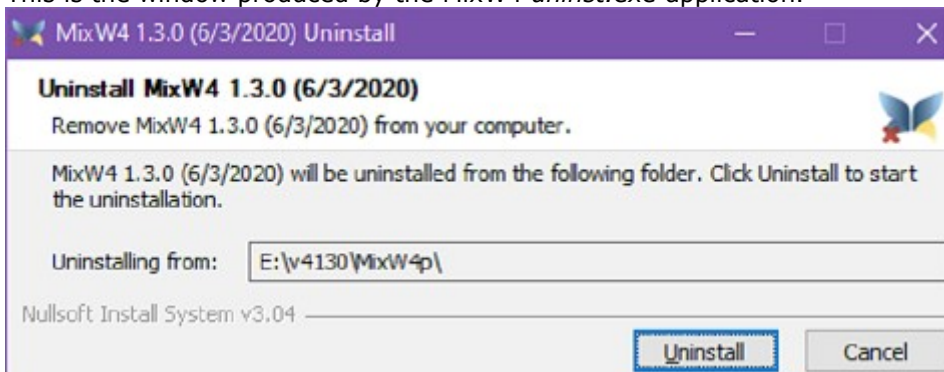
**Activating uninstall - 2.**



Using windows explorer find the *uninst.exe* program in the MixW4 program files folder.  
Activate this program.

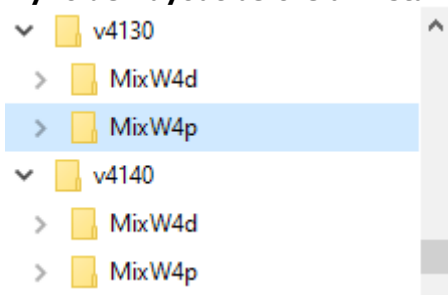
**The Common route.**

This is the window produced by the MixW4 *uninst.exe* application.

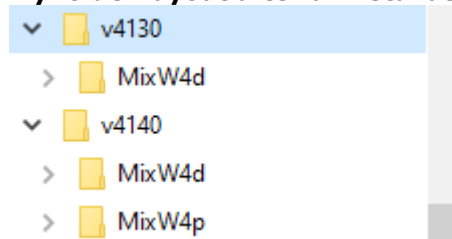


Click on Uninstall to activate the process.

**My folder layout before uninstallation.**



**My folder layout after uninstallation.**



The uninstall program deletes the program files folder but leaves the data file folder intact.

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Any suggestions, comments or corrections please email me using My QRZ.com email address.

Help File produced by Colin 2E0BPP.