MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

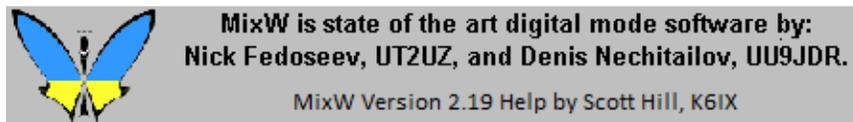MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Overview

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1. **Welcome to MixW -- Information about the Program**

2. **Quick Start -- For experienced digital mode users**

3. **Registration -- How to become a registered user**

4. **Using the MixWHelp System -- Finding Information!**

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MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Welcome

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The Demo version of the MixW program is good for 15 days. For registration information please see Registration

There are 5 sections in MixWHelp. This overview is Section 1. To download sections 2 - 5 please see: Using MixWHelp

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MixW stands for a Mixture of different modes. MixW now fully supports CW, BPSK31, QPSK31, BPSK63 & 125, MFSK, RTTY, FSK31, Packet (HF and VHF including TCP/IP over AX25), Pactor RX/TX (TX requires TNC), Amtor (Sitor) TX/RX (No TNC needed), Hellschreiber, FAX (RX only), SSTV, THROB, and MT63. In addition to these built-in modes, new modes can be added to MixW using a facility called "External mode plugin support". The first example of a plugin mode was Olivia, which was included in the 2.16 release package.

MixW also includes support for multimode TNCs for those preferring a hardware-based approach to the digital modes. Even more modes can be accessed by configuring MixW to call other software packages from within MixW.

Other MixW features include a voice keyer for SSB, FM, and AM phone modes. Excellent logging, QSO scheduling and reminding, and even auto CQing of scheduled events through the fully configurable MACROS. There is also a sophisticated contest mode facilitating competitive digital mode contest operation,

and an export of the contest log to the newly required Cabrillo format. The log will import and export CSV and ADIF files. MixW has support for printing custom QSL cards or labels. There is built in DX Cluster support either via Packet Radio or the internet.

MixW does not require a TNC to operate. The only requirement is that you have a computer running Windows 9x, ME, NT, 2000, or XP operating system, and a compatible soundcard.

If you are experienced with the sound card modes you can just go straight to the Quick Start.

If you are new to SoundCard digital mode operation, you will need to connect your radio's transmit and receive audio to your computer soundcard via the mic or line input, and the headphone or line output. You will also need to provide for transmit keying by PTT or some other method.

The following site is recommended for additional information about interfacing your radio with the computer. First go to:

Understanding Soundcard Interfacing, by Ernie Mills, WM2U:
http://www.qsl.net/wm2u/interface.html

to get an overview of the subject. Then if you are a home brew ham, just get to work and build an interface. If you are an appliance type there are plenty of plug-and-play interfaces. Follow any of the links on Ernie Mills' site above, use your favorite search engine, or check amateur radio magazines for the latest information.

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Note: The authors of the MixW software, Nick and Dennis, have introduced a soundcard interface device manufactured specifically for use with MixW. To learn more about the interface, called **RigExpert**, see Nick's website at: http://www.mixw.net

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AND NOW A WORD FROM OUR SPONSORS

For the latest MixW software and related information, visit the MixW websites at:
http://www.mixw.net
and
http://mysite.verizon.net/jaffejim/

For the latest version of MixWHelp and related information, visit the MixWHelp website at:
http://k6ix.net/MixW.html

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MixWHelp by Scott Hill, K6IX
with many thanks to the following contributors:

Scott E Thile, K4SET
Denis Nechitailov, UU9JDR
Howard (Skip) Teller, KH6TY
Richard B. Griffen, NB6Z
Jim Jaffe, WA2VOS
Finn Helmuth Pedersen, OZ6LI

Bob Parker, K4PPN

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To learn more about using MixWHelp, see Using MixWHelp.

If you have any concerns or comments about the contents of MixWHelp contact:
Scott Hill, K6IX (scott(at)k6ix.net)
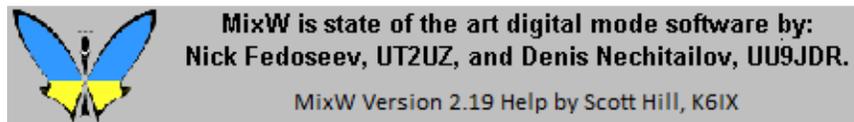
MixW: Quick Start
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A brief outline for configuring and operating MixW for experienced sound card digital mode users. For the full MixWHelp suite see: Using MixWHelp

If your station is already interfaced and configured for SoundCard digital software, and you're an experienced operator with the SoundCard digital modes, then all you need to do to get on the air with MixW is:

- **Install the software**
- **Configure your Personal Data**
- **Configure your Transceiver PTT settings**
- **Review the commands for basic operation**
- **GOTA! (Get on the Air)!**

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Install the software:

The program download is a self extracting installation file. You can choose any directory you would like, or use the default directory of C:\Program Files\MixW\

The extraction procedure will automatically install all the files MixW needs to run on your system. The most important files for you to know about are:

MixW2.exe (the main program file)
bands.ini (default band frequency information)
contest.mc (contest macros)
CmnData.dll (program information)
cty.dat (antenna heading system)
pfx.dat (prefix id file)

Other files are automatically created by MixW which are:

MixW2.log (default log file - **be sure to back up often!**)
MixW2.ini (saves your configuration - **back up often**)
MixMacros.ini (default macro file created when you first modify a macro)

As you learn to use new features of MixW you will create new files, particularly for your mode specific macros. These files will have a .mc or .ini extension. **Be sure to back up all of your *.mc and *.ini files, as well as your .log files.**

Finally, if you have registered MixW, make a copy of your MixWReg1.dll file and paste it into your MixW folder.

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NOTE: There are TWO DIFFERENT MENU LAYOUTS AVAILABLE IN MIXW. To use this help system your menus should look like this:

MixWHelp uses ONLY LAYOUT 1. If your menu items are different than the ones shown above select: View | Menu and choose Layout 1.

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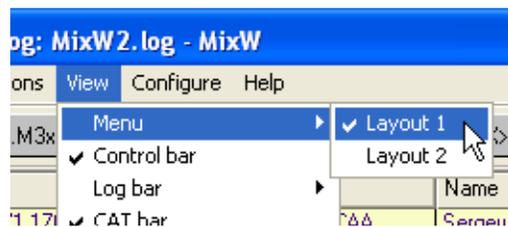
Configure your Personal Data: Select Configure | Personal Data. This will display the following dialog box:

Enter your Station information and select your CW ID options, then click OK. (Your callsign should be in ALL CAPS).

Configure your Transceiver PTT settings:

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The authors of the MixW software, Nick and Dennis, have introduced a soundcard interface device manufactured specifically for use with MixW. For instructions on configuring and using this interface, called **MixWRigExpert**, see Nick's website at: http://www.mixw.net

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If you are using VOX to trigger TX/RX function, and you are not using CAT features you can ignore this section entirely and go directly to the Commands for basic operation.

If you are triggering TX/RX with a PTT circuit, or CAT control, you will need to configure MixW to key your transceiver. To do so Select: Configure | TRCVR CAT/PTT. This will display the following dialog box:
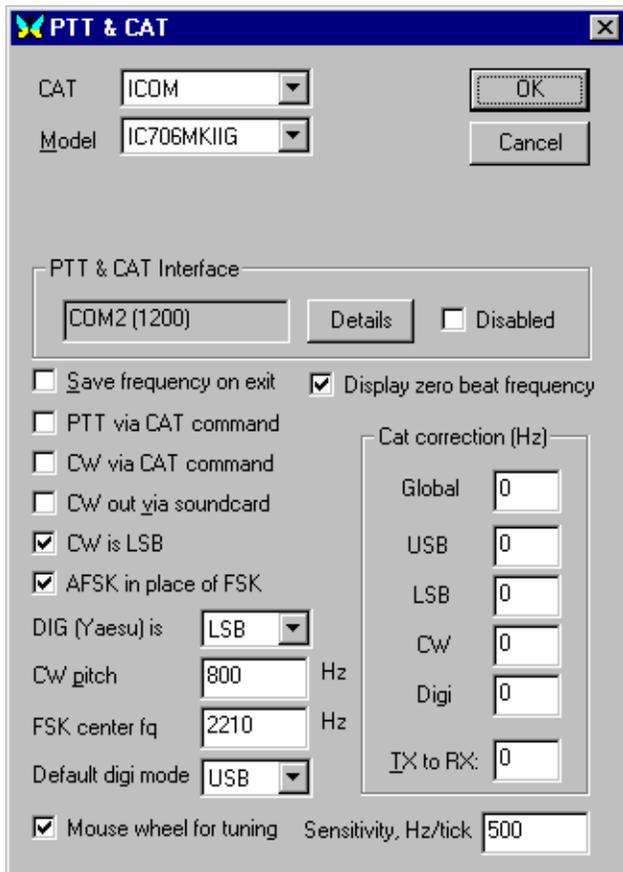
This dialog box is for the PTT and/or CAT features. If you will not be using the CAT function, set TRCVR to "None", ignore the rest of this dialog, and click on "Details" to configure your PTT COM port options.

If you will be using CAT for PTT, first select your transceiver make and model from the drop down menus. (**Note:** if your model is not listed, try a similar model of the same make. For instance, almost all CAT capable Kenwoods work with the TS-850 setting). Next, check PTT via CAT command box, then click on "Details" to configure your CAT COM port options.
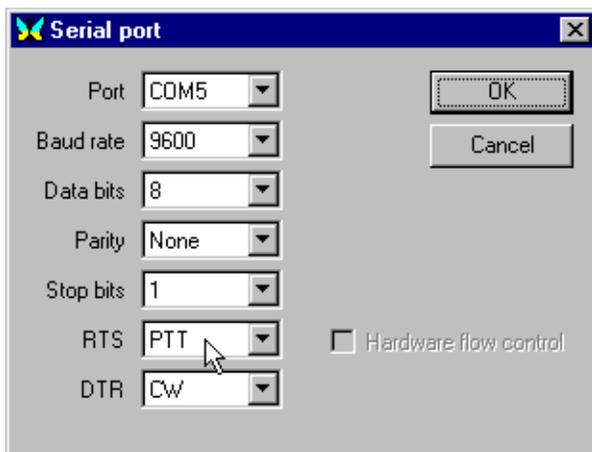
Select the COM port you will be using. If you are using this port for PTT only, then only the COM port number and the RTS/DTR settings apply. If you are using this port for CAT PTT then set the port to match the requirements of your transceiver for CAT.
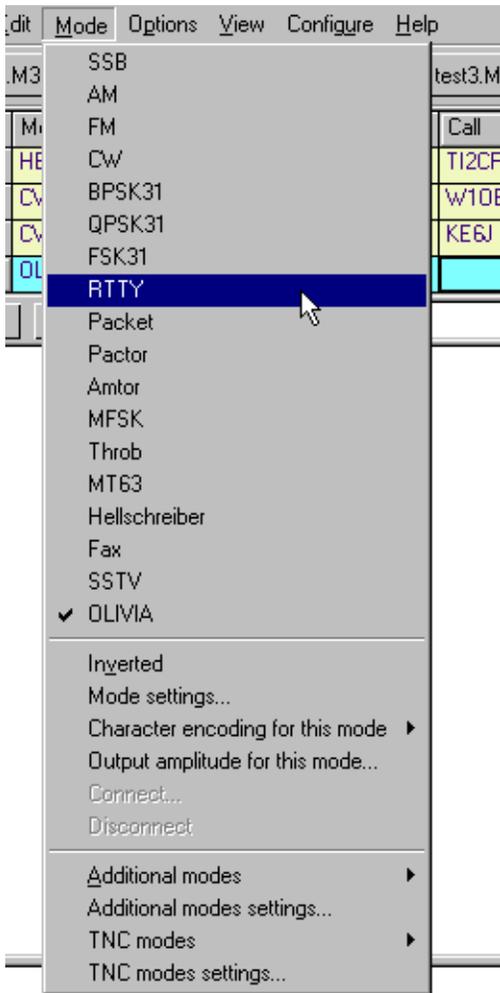
If you want to use one COM port for CAT and another for PTT, first configure the CAT/PTT port for CAT, then choose: Configure | Secondary PTT port | Port Settings to set the secondary COM port for PTT.

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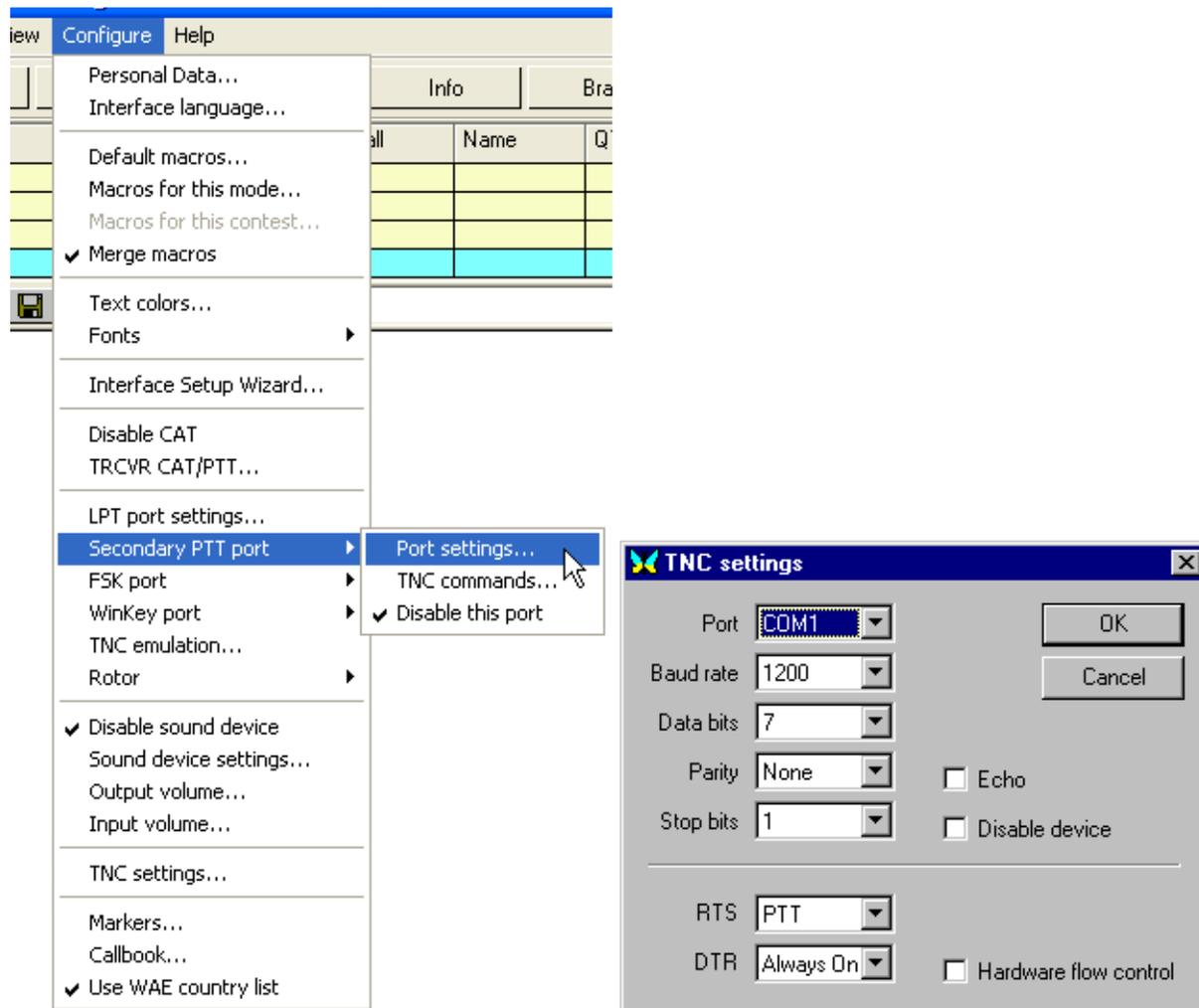
Commands for basic operation:

Mode selection
Select the mode you wish to operate by clicking Mode | your choice of mode:

Notice that the status bar will change according to the options and features specific to the mode you have selected, and the mode will be indicated in the mode box. For instance, IMD is only relevant in the PSK modes, while Connected or Disconnected is only relevant for the connected modes:
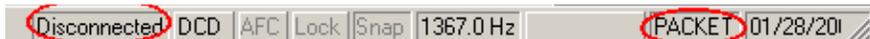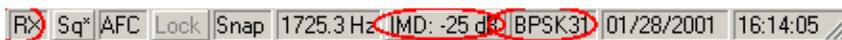
You can also switch modes by clicking on the mode box in the status bar and selecting the mode you wish to operate from the pop up menu:

```
        SSB
        AM
        FM
        CW
        BPSK31
        QPSK31
        FSK31
        RTTY
        Packet
        Pactor
        Amtor
        MFSK
        Throb
        MT63
        Hellschreiber
        Fax
        SSTV
    ✓   OLIVIA

        Inverted

        Character encoding   ▶
        Mode settings...
    OLIVIA  09/10/05  01:54:34 z
```
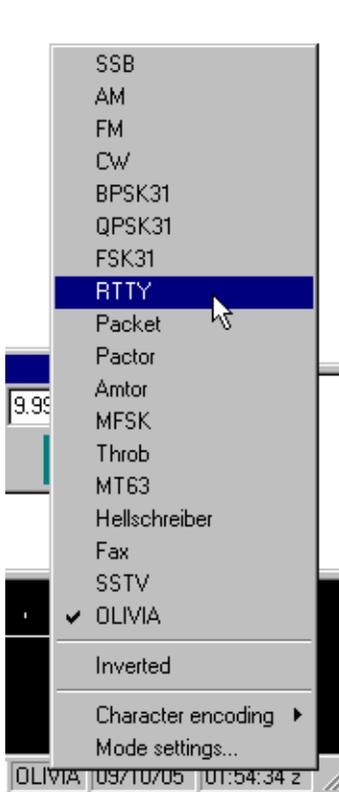
Switching between TX and RX: There are several ways to switch MixW between TX and RX. The Pause/Break key (on the computer keyboard) will toggle TX/RX. You can also toggle TX/RX by clicking on the TX/RX box in the Status Bar, or by using the TX and RX buttons on the Macro Bar (depending on your Macro Setting).

Panic Button: Pressing the "Esc" key twice will immediately stop Transmission. Text remaining in the TX window will NOT be sent.

Positioning and Sizing Windows
Pointing to a vacant space on the Control Bar, Log Bar, Tuning Indicator, or any of the other "Dockable" windows and holding the left mouse button down while moving the mouse makes it possible to reposition and dock any of these features. An outline of the feature will appear when the mouse is first moved, and when that outline shrinks, it indicates a position where the feature may be placed by releasing the mouse button. The docked position of the feature will be remembered from session to session in the MixW2.ini file.

Pointing to a window separator will cause the mouse cursor to change to a small pair of parallel lines, and pressing the left mouse button and keeping it pressed will make it possible to resize the Spectrum, TX or RX windows. Releasing the mouse button will leave the window in the resized position.

The following screen indicates one approach to screen layout using the various MixW displays:
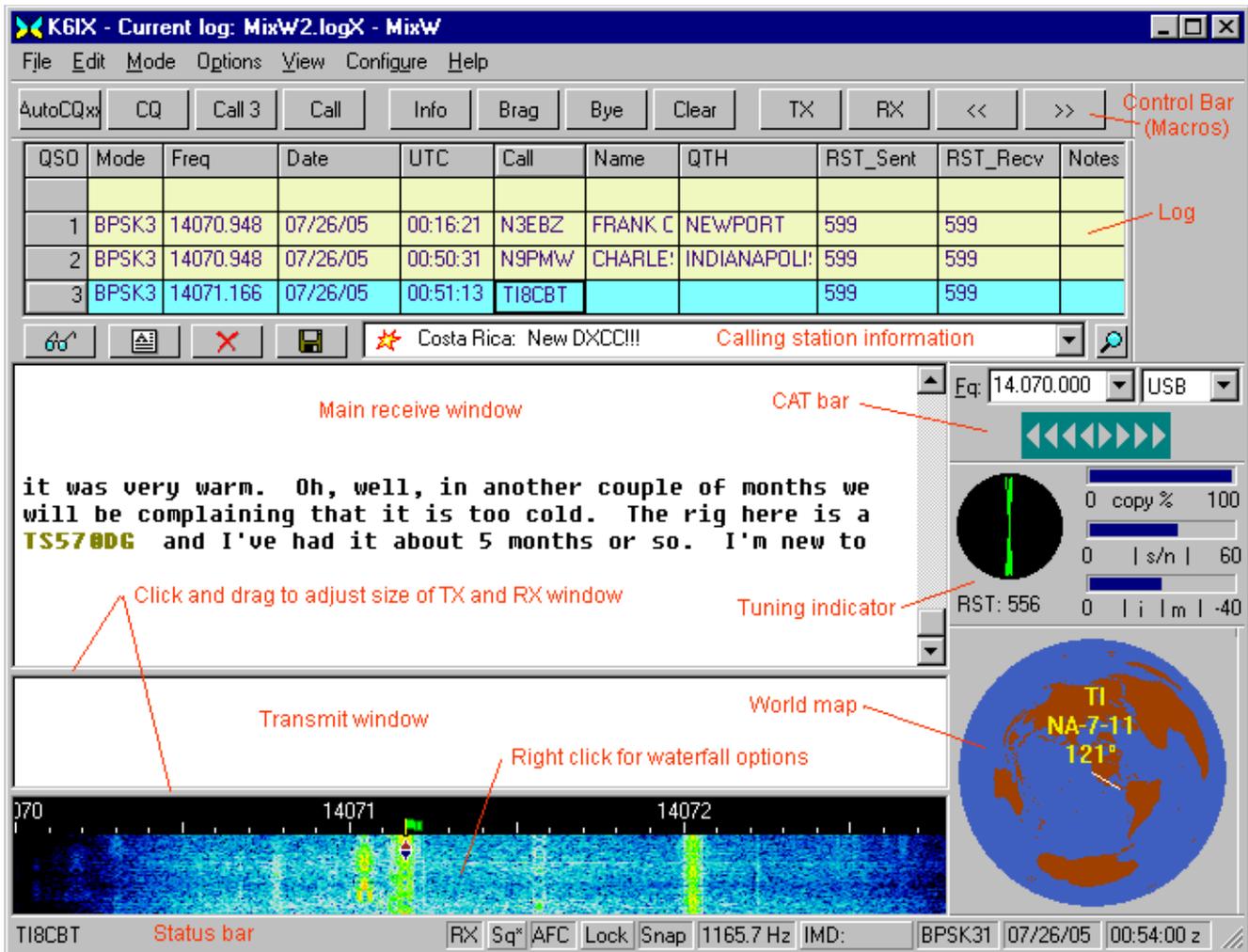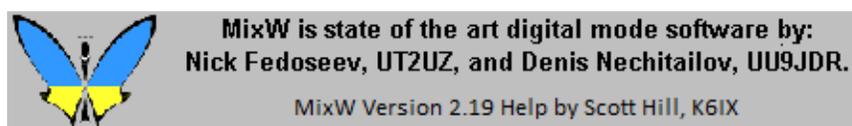
Opening Multiple RX Windows
To open additional RX windows, right click on a signal in the waterfall and select: New RX window. To TX on the frequency of a secondary RX window, right click on the secondary window and select: Swap. The primary RX window will be swapped with the selected secondary window and then RX can be initiated on that frequency.

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These basic commands will suffice to get you on the air with MixW's default settings in most of the modes, however, there are many user configurable settings to refine and improve your operation. To learn more about general operating settings, as well as settings for the specific modes offered in MixW, see the Welcome and Using MixWHelp topics for information on other MixWHelp modules.

The Demo version of MixW is good for 15 days. For registration information click Registration.

MixW is state of the art digital mode software by:
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MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Registration

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The Demo version of MixW is good for 15 days. There are no other restrictions on the demo.

The Registration Fee for MixW2x is $50 USD.

To **register and pay online,** please visit: http://www.mixw.net

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US Stations who wish to register by mail should send Cash, Check, or Money order (Payable to Jim Jaffe) to:

Jim Jaffe, WA2VOS
141-08 71 Road
Flushing, NY 11367-1945.

Overseas Stations should send US funds, either Cash or International Money Order.
Non-US Checks and Credit Cards are not accepted.
A registration form can be downloaded from: http://mysite.verizon.net/jaffejim/

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When your registration is received you will be sent a special registration file via EMAIL which will stop the timer in the downloaded program.

A dual registration can be issued provided that the second call is either the user's own MARS call, another personal call issued by a different country, or another member of the Immediate household living at the same address (confirmed by a callbook).

A CD can also be ordered (for an additional fee) from Jim Jaffe's site.

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For additional registration information visit:
http://www.mixw.net,
and
http://mysite.verizon.net/jaffejim/

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MixW: Using MixWHelp

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NOTE: There are TWO DIFFERENT MENU LAYOUTS AVAILABLE IN MIXW. To use this help system your menus should look like this:

K6IX - Current log: MixW2.log - MixW

File   Edit   Mode   Options   View   Configure   Help

MixWHelp uses ONLY LAYOUT 1. If your menu items are different than the ones shown above, select: View | Menu and choose Layout 1.

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MixWHelp can provide you with very powerful methods to help you find the information you are looking for, if you take just a moment to learn to use the tools available.

FIRST: Notice that the Table of Contents stays visible under the Contents tab in the left panel while you are viewing the contents of the topic in the right panel. The name of the topic you are viewing is highlighted so you can keep track of where you are in the file.

SECOND: The Search tab provides a full text search which will find, and highlight, every occurrence of a word. This not only helps you find the topics where a subject is discussed, but makes it easy to locate the word within the topic by looking for the highlight.

THIRD: Use the Back and Forward buttons at the top of the Help window when you return to topics you have been reading. The Back and Forward buttons will take you to the position in the topic from which you left, rather than back to the top of the topic.

FORTH: MixWHelp has 5 modules, each of which can be downloaded individually, so that you only need to download the modules you want, or the modules which have been updated. After downloading unzip and place the modules you want to use in the MixW folder. All modules are optional except the Overview of MixW module (which is included in the program release package).

NOTE: Windows may mark the unzipped (.chm) files as a security risk. If you are not able to access a downloaded and unzipped file, right click on the .chm file. Then left click on Properties at the bottom of the menu. In the Properties dialog box look at the bottom for a statement like: "Security: This file came from another computer and might be blocked to help protect this computer". Click the Unblock button beside that statement, and then click the Apply and OK buttons.. Repeat for each .chm file that will not open.

| Module Name	File Name	Comments
Overview of MixW	MixWMain.chm	Required Module Must be in MixW Folder
Configuration and Set Up	MixWConfig.chm	Covers the most important MixW features
Operation	MixWOps.chm	Menu descriptions and operations that are common to all modes

Digital Modes	MixWModes.chm	Basic theory and operating specifics for each of MixW's modes
Appendices	MixWApndx.chm	More detailed and less frequently used information

To use MixWHelp standalone, such as on a different computer, copy the modules you want onto the computer and create a shortcut, on the desktop, pointing to MixWMain.chm.

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There is also a PDF file available which contains all 5 sections of MixW Help (version 2.19). With the PDF format you can print only the pages you want to print. To download the 4.10 MB file click on: http://k6ix.net/MixW/MixWManual.pdf.

Note: A red star on the topic symbol in the Contents indicates a new topic, or a topic with major modifications.

To download the MixWHelp modules click on the links above or see:
http://k6ix.net

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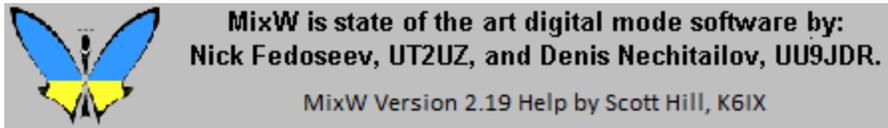
MixW: Configuration and Set Up
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1. Configuration -- Software Settings

2. Basic Set Up -- PC/Tcvr Interface

3. PTT Circuit -- Hardware Connection

4, Configuring Macros -- Operating Efficiently

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Note: The authors of the MixW software, Nick and Dennis, have recently introduced a unique soundcard interface device manufactured specifically for use with MixW. To learn more about the interface, called **RigExpert**, see Nick's website at: http://www.mixw.net

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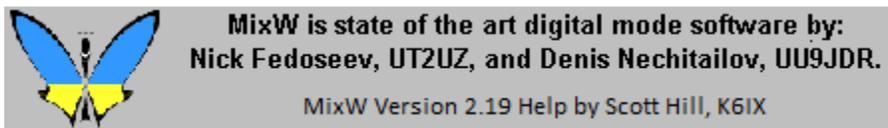
MixW: Configuration
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NOTE: There are TWO DIFFERENT MENU LAYOUTS AVAILABLE IN MIXW. To use this help system your menus should look like this:

MixWHelp uses ONLY LAYOUT 1. If your menu items are different than the ones shown above select: View | Menu and choose Layout 1.

Personal Data
Your first task is to tell MixW who you are, and where your QTH is. Click on Configure | Personal Data. This brings up the following dialogue box:

Fill in your station information, as indicated. (Use ALL CAPS for your callsign).

Note: In North and South America your longitude will be a negative (-) number.

If you want to be able to send a CW ID at the end of your transmissions, click the checkbox, choose the speed, and enter the text to send. The <CWID> command, inserted in your sign-off Macro, sends your CD ID string. When finished configuring here click the OK button.

Note: You must at least enter your station call sign in order to transmit with MixW.

MACRO Configuration
MixW has extensive Macro features for contesting as well as rag chewing. See Configuring Macros for instruction on configuring and operating with Macros.

Fonts
Select Configure | Font for TX/RX windows, |Font for macro buttons, or | Font for the Log Bar. This will bring up the font selection dialog box. Here you can select the font that will be used in your receive and transmit windows, for the macro buttons, or in the Log Bar.

Text Colors
Select Configure | Text Colors. This will bring up the following dialog box:
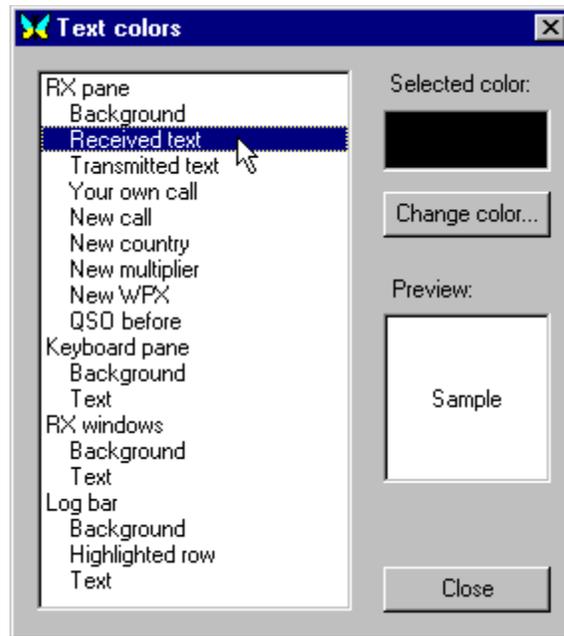
Here you can select the text colors for the various text types. This is a handy way to customize your text to easily recognize call signs, new call signs, new DX, customize contest mode colors such as new multiplier or QSO before, receive and transmit window background colors etc... The ability to customize your applications and operating preferences is an important feature of MixW.

Configure your Transceiver CAT and PTT settings:

Note: The authors of the MixW software, Nick and Dennis, have recently introduced a unique soundcard interface device manufactured specifically for use with MixW. To learn more about the interface, called **RigExpert**, see Nick's website at: http://www.mixw.net

If you are triggering TX/RX with a PTT circuit, and/or using CAT control, you will need to configure MixW to communicate with your transceiver. To do so Select: Configure | TRCVR CAT/PTT. This will display the following dialog box:
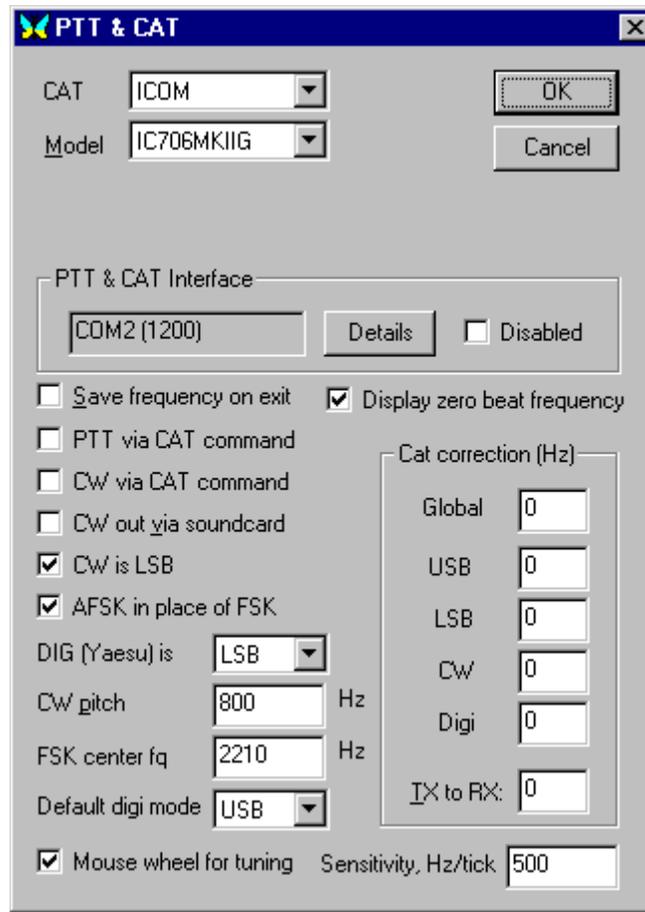
This box is for the PTT and/or CAT features. If you will not be using the CAT function, set TRCVR to "None" and click on "Details" to configure your PTT COM port options.

If you will be using CAT, select your transceiver make and model from the drop down menus. **Note:** If you do not find your model continue to look carefully all the way through both lists. The lists are not in order. If your model is not listed, try a similar model of the same make.

Display zero beat frequency: If checked the CAT Bar will display the frequency of the transceiver. If not checked the CAT Bar will display the frequency of the current QSO.

Check the PTT via CAT command box, if aplicable, and then click on "Details" to configure your CAT COM port options.
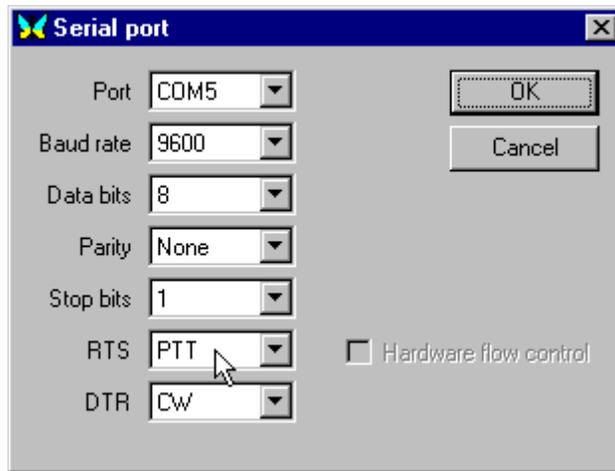
Select the COM port you will be using. If you are using this port for PTT only, then only the COM port number and the RTS/DTR settings apply. If you are using this port for CAT then set the port to match the requirements of your transceiver for CAT.

If you want to use one COM port for CAT and another for PTT, first configure the CAT/PTT port for CAT, then choose: Configure | Secondary PTT port | Port Settings to set the secondary COM port for PTT.
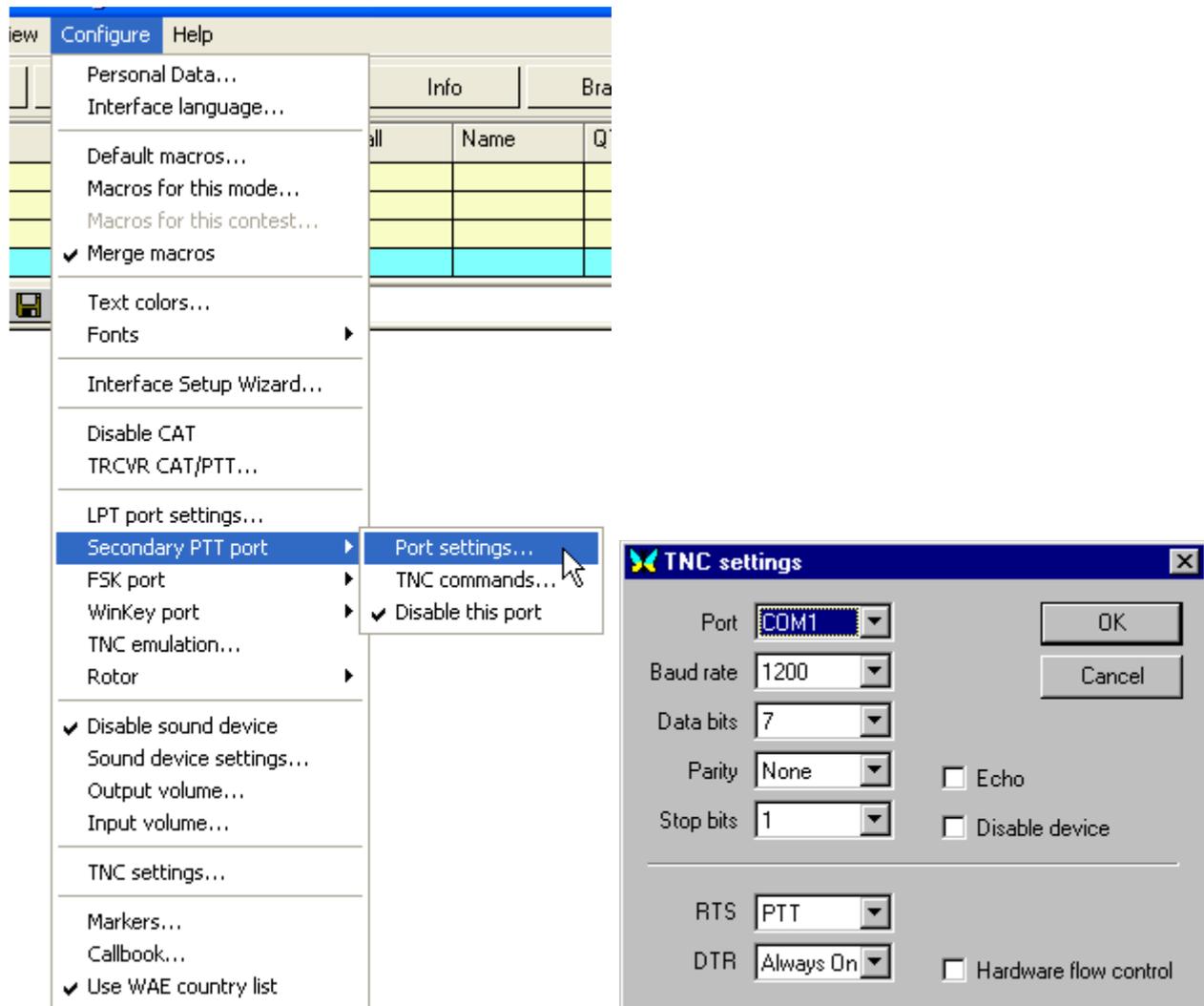
If you are triggering PTT by radio command (CAT) and do not need to key a separate PTT or CW circuit then you can click the Hardware flow control box in the CAT/PTT Serial Port dialog, and make sure your COM Port, Baud Rate, Data Bits, Parity, and Stop Bits match your transceiver's settings. RTS and DTR are not used. **Note:** The transceiver must support "hardware flow control" if this box is checked. If it does not support it, you will encounter several problems. If this is the case, uncheck the "hardware flow control" box, and instead set the DTR and RTS to "always on". Make sure you have enabled the PTT via CAT in the previous dialog box.

The RTS and DTR pins of the selected COM port are where High/Low signals are delivered to key your PTT circuit, your CW circuit, or both. They can also be set to "always on" or "always off" to facilitate a combination of PTT keying via a PTT circuit in conjunction with using CAT for automatic rig QSY, frequency reporting, and other features.

RTS uses pin 4 for the DB-25 connectors, or pin 7 or the DB-9 connectors. DTR uses pin 20 of the DB-25, or pin 4 of the DB-9.

Configuring for LSB or USB operations: The MixW options for RF, USB/LSB should be configured to reflect your mode of operation by selecting View | Spectrum | "Sound". "RF, USB", "RF, LSB" or "Auto". These must be set correctly in order for the frequencies in the log and spectrum/waterfall displays to represent your actual operating frequencies, and for MixW to automatically adjust the

inversion settings based on your RF mode.

Inversion: Note: This feature works differently in MixW than most other SoundCard digital programs, so please read and understand the following information to avoid confusion while operating.

Modes that utilize the inversion feature are QPSK31, MFSK16, RTTY, AMTOR, Hellschreiber, THROB, and FAX. In MixW, "Inverted" means to invert the Mark and Space tones from the normal operating standards of the active mode. This feature can be used in cases where the station you are attempting to work is inverted.

To illustrate: When using a traditional hardware TNC, RTTY is almost always operated in the LSB mode, utilizing a 170 Hz shift between the MARK and SPACE tones, with the MARK tone being the higher in frequency. If MixW is set on "RF, LSB" it will set the Mark tone as the higher tone. However, if MixW is set on "RF, USB" then the Mark tone will be set to the lower tone. (You can **think of this as an automatic inversion** if you like). In other words, if MixW is configured correctly (it needs to know if you are using LSB or USB) then it will automatically adjust your Mark and Space tones for you. You would **only use the "Inverted" feature to operate inverted from the standard practice of that mode** of operation, regardless of whether you're using USB or LSB.

If you are configured to use the CAT features of MixW, the USB/LSB and frequency changes will all be done automatically for you by selecting View | Spectrum | Auto:
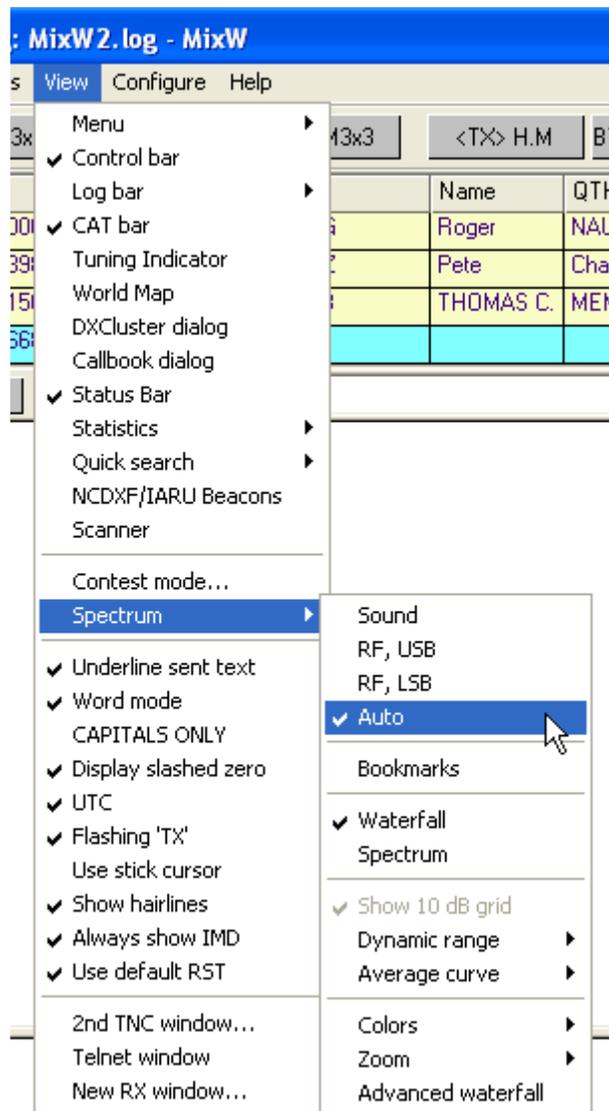
Now, MixW will automatically know if you are using USB or LSB, as well as your operating frequency by polling your transceiver via the CAT feature. Your MixW operating frequencies (in the spectrum display as well as the log and CAT bars) will also automatically represent the audio offset, which will be either plus or minus your transceiver's frequency, depending on whether you are operating LSB or USB.

If you are not using CAT to determine your mode and frequency, you can still set your "RF, USB" or "RF, LSB parameters manually from this menu. Your frequency will be accurately displayed as long as you manually set your frequency in MixW to match your transceiver's frequency and sideband. This can be done using Alt-F to bring up the CAT bar and entering the settings manually.

Selecting View | Spectrum | Sound will show the audio offset alone, without regard to the RF operating frequency. **Note:** The audio frequency can also be displayed by placing the cursor above the spectrum display until you see the cursor turn into a hand and pressing the left mouse button.

Rotor Selection and Control

This section pertains to PC controllable Rotors. Select Configure | Rotor | and then click on your Rotor brand.
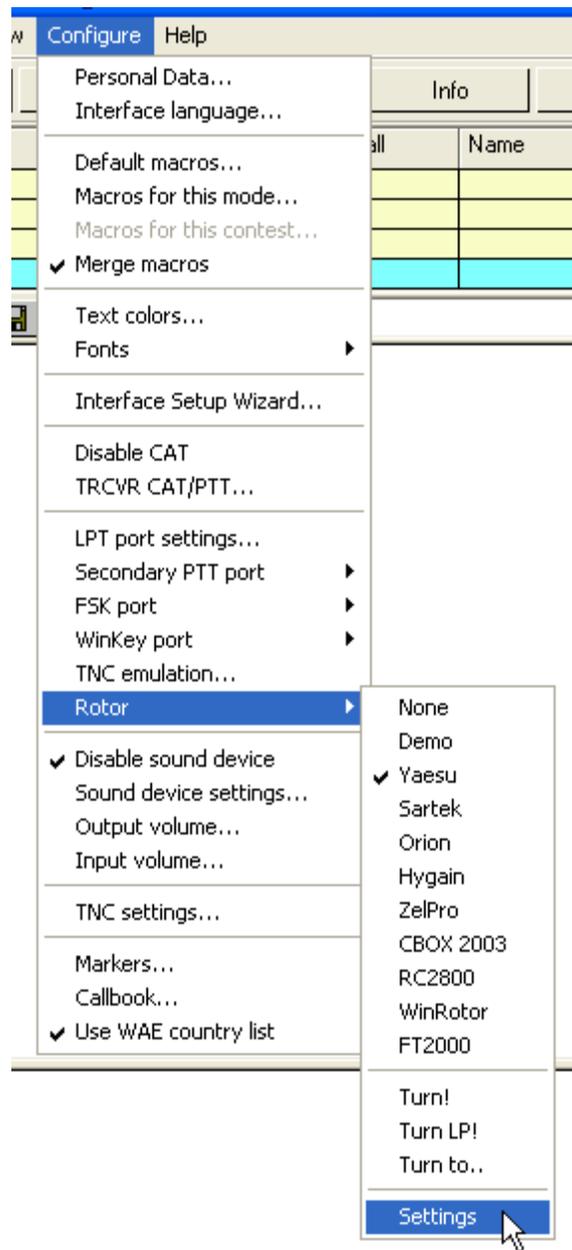
Next select Configure | Rotor | Settings. This brings up the following Port dialog:
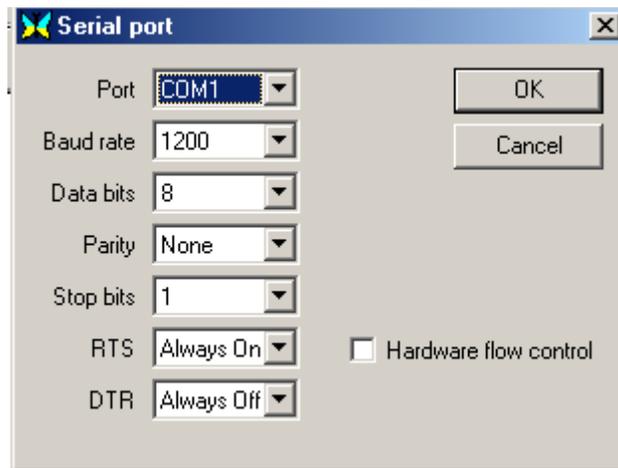
While this looks the same as the Port dialog for your CAT/PTT information it is for selecting your Rotor control information. Set these parameters by consulting the manual for your rotor.

When you click OK to close this dialog a box will pop up to allow you to input an Azimuth setting. Type it in and click OK. This can be changed later by selecting Configure | Rotor | Turn to... Your other options are Turn! (Turns the rotor toward the station in Call), and TurnLP (Turns the rotor torward the long path direction of the station in call).

Configuring the Sound Device

Open the sound device settings dialog by selecting Configure | Sound device settings... If you have multiple sound devices in your system, you select which one you want MixW to use for TX and RX functions. You can also set the sample rate, sound history, spectrum speed, as well as select a DSP filter, which can help your copy in certain conditions.
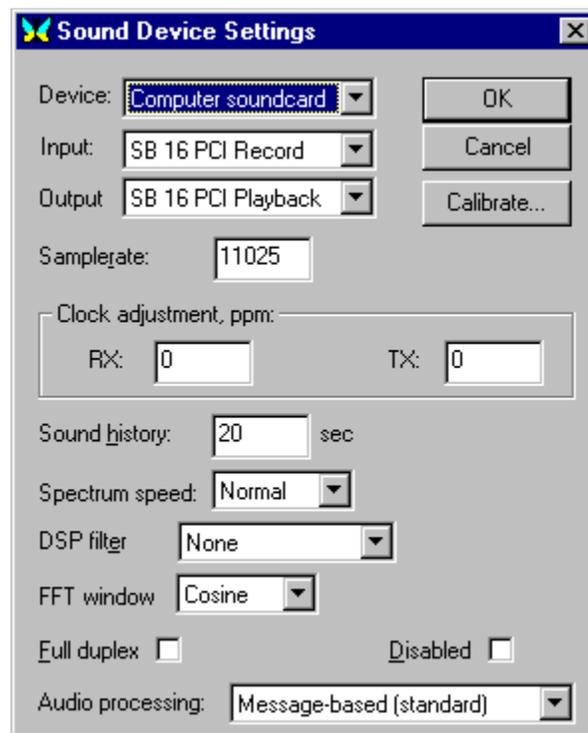
Sample rate: A value between 7000 Hz and 12000 Hz for a soundcard sample rate is displayed. MixW

works best with the default sample rate of 11025 Hz, although other rates can be used to accommodate differences in soundcards. Generally, it is not necessary to modify the default value except in special circumstances.

Calibrate: The correct operation of many MixW modes depends on a properly claibrated soundcard. For calibration procedures see: SSTV Operation in the Digital Modes Section of this Help File.

Sound history: This selection presents an input box for entering the number of seconds of previous reception to be stored in MixW to be played back by holding down the Shift key while clicking on a signal. The signal will be played back at an accelerated rate.

Spectrum Speed: This setting alters the speed of your waterfall or spectrum display. A faster display will make tuning in signals easier and faster, but it also requires a faster computer and soundcard.

FFT window: Square has best frequency resolution, Nuttall has the best sidelobe suppression and is the best for IMD measurements, and Cosine (default) is a reasonable compromise for usual daily operations.

Waterfall Audio Frequency Markers
By selecting Configure | Markers... markers can be set in up to 5 audio frequency locations. This will place a thin red line running down the waterfall display at the desired location as follows:
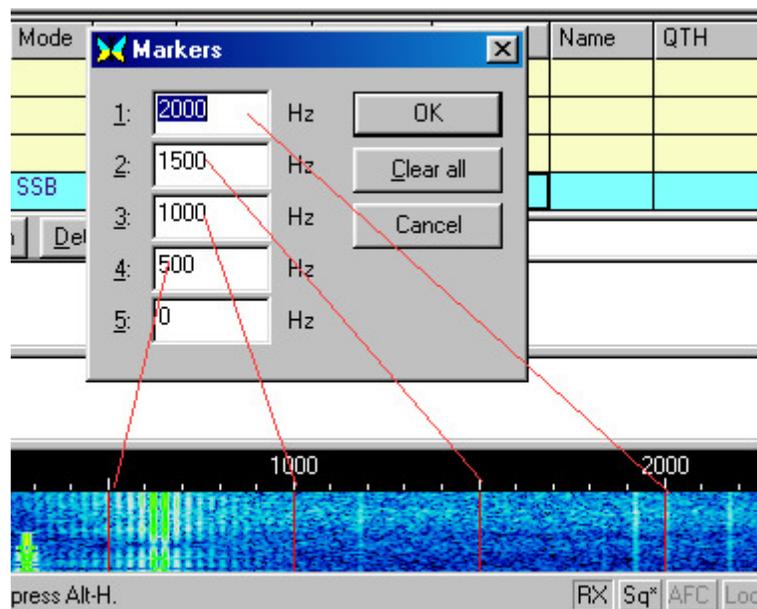
Waterfall Known Frequency Markers
By placing known frequencies in the "KnownFqs.dat" file a grey marker can be placed on the waterfall at that frequency. In the example below a NCDXF/B marker at 14.100 mhz is shown. Open the file with a text processor to add your own frequencies. View | Spectrum | Bookmarks must be checked to make the markers visible. A temporary known frequency can be set at the current RX position by right clicking on the waterfall and selecting Mark Known Fq.
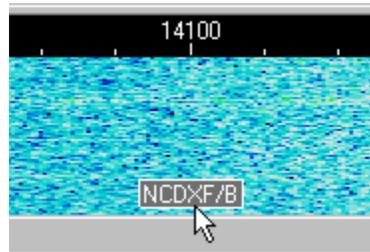
Band Edge Markers

A small red circle with a white line throught it (international "Do Not Enter" traffic sign ?) is placed just below the lowest frequency for the band and just above the highest frequency for the band. The lowest and highest frequencies are taken from the Bands.ini file which you can modify using a text editor such as Notepad.
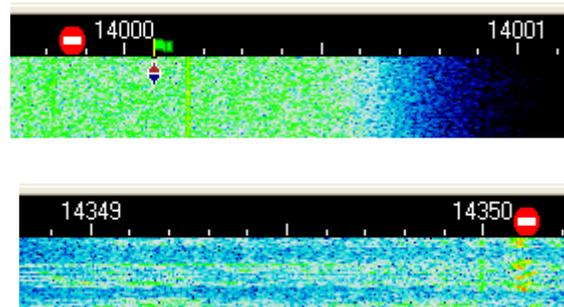
Callbook...

MixW will automatically look up log entries in a callbook. Select Configure | Callbook... In the Callbook settings dialog select your Callbook type and provide the path to the callbook database. For example, if you have copied the QRZ database to your C: drive, you would enter "C:\callbk\". If you are using the QRZ directly from the CD you would enter "D:\callbk\" if your CD was in drive D. Next select Options | Auto search in callbook. Now when you enter a call in the current QSO line of the log MixW will look up the call and display it as shown here.

NOTE: The data shown when the mouse pointer is hovered over the call does NOT come from the

callbook.

MixW: Basic Set Up

Interfacing your Transceiver to your PC:

Interfacing your transceiver and PC to work with MixW can be handled many ways. A two-way audio path must be provided between the transceiver and the computer soundcard, and the transceiver needs to be switched between TX and RX. You can configure MixW to switch between TX and RX in four ways.

1. 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. Use transmit and receive commands to the radio via the serial port through CAT, without using the PTT circuit (your radio must support PPT by CAT).
3. Use the VOX circuit in your radio to switch it into transmit when it hears the audio sent by the computer, and back to receive when the audio stops.
4. Operate the radio transmit/receive manually

Note: The authors of the MixW software, Nick and Dennis, have recently introduced a unique soundcard interface device manufactured specifically for use with MixW. To learn more about the interface, called **RigExpert**, see Nick's website at: http://www.mixw.net

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.

It is extremely important to match your sound input and output levels. This is done with the Windows Volume and Recording controls. The windows Volume and Recording controls can be launched from within MixW by selecting Configure | Input volume, or Configue | Output Volume. Be sure your MixW software has been configured as described in Configuration.

Setting Audio RX Levels:

Set the input volume first by selecting Configure | Input Volume, which will bring up some version of the audio mixer recording control.
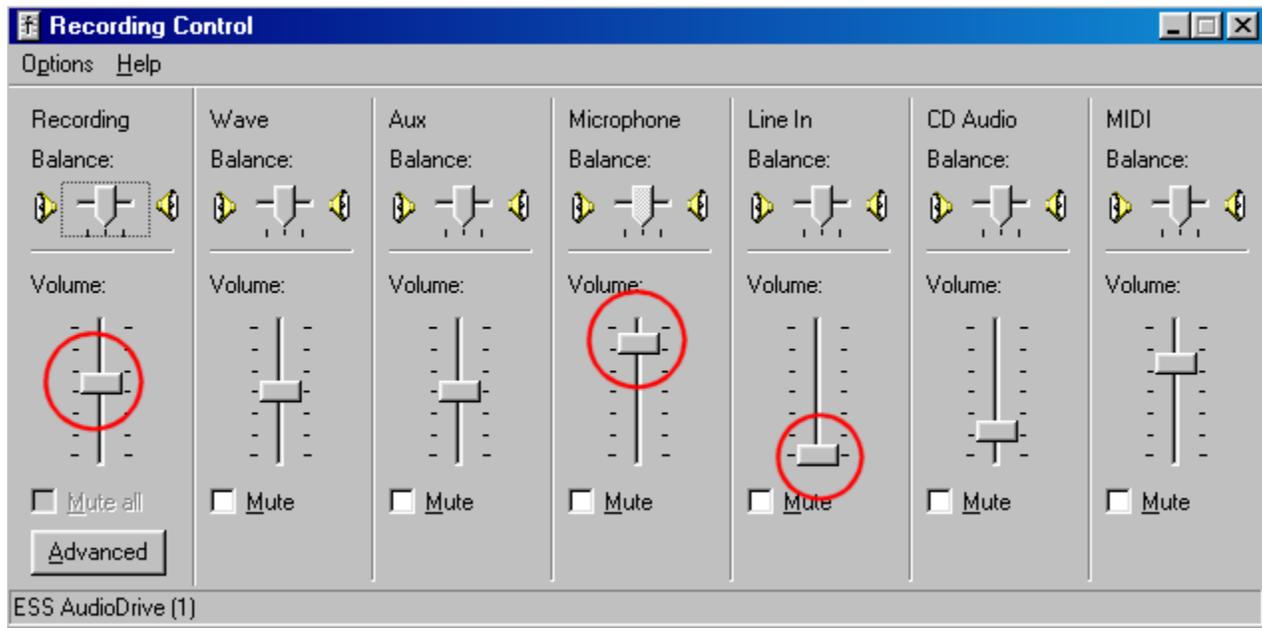
For these adjustments it is convenient to arrange your MixW window and your audio mixer control so that you can easily see both windows and switch between the two. Set your transceiver's audio (listening) volume to a comfortable listening level.

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.

Adjust the input level on the Mic or line inputs until the background noise shows a dark to light blue color, and the actual signals (or strong noise) are a light green color. Strong signals on the tuning display will be yellow or orange. It's very important not to overdrive your soundcard inputs. Overdriving these inputs will severely degrade your copy, and give you inaccurate IMD readings. 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 ("Mute" is a check box near the slider) 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 adjutments 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.

With the interface connected, and your transceiver connected 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. To set the output level bring up the Windows Volume control by selecting Configure | Output volume:
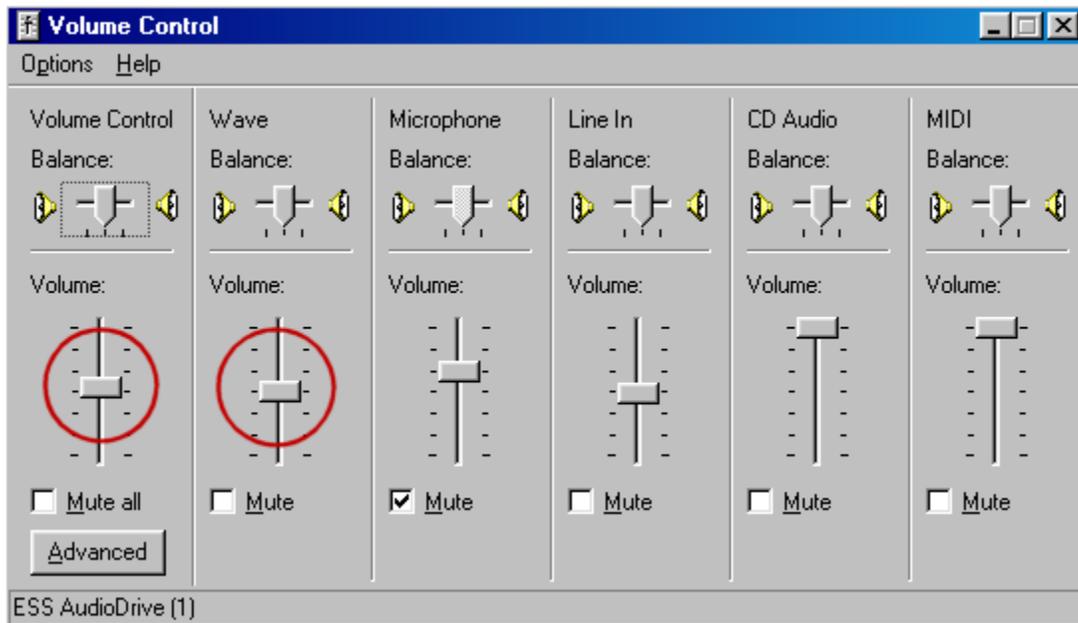
These audio output adjustments are best made with your transceiver connected to a **dummy load**. This eliminates QRM as well as wear and tear on your equipment. Set your transceiver MIC gain control (if you are using mike input) slightly above its minimum setting and make sure your rig's VU meter (or 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), and the Wave slider at just slightly above the minimum setting.

First select the BPSK31 mode by selecting Mode | BPSK31. Put MixW into transmit by clicking the RX in the status bar. The "RX" turns to "TX", and MixW will transmit a BPSK31 idle signal. To toggle back to the receive mode click the "TX" box in the 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 you're 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.

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

MixW: PTT Circuit
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You have three basic options for PTT transmitter keying:

- Keying of the radio PTT line from a dedicated serial port,
- Direct command to PTT on/off Via the PC - Radio command interface (Certain radios only).
- Sharing the PC-Radio command serial port with the PTT circuit.

See Configuration to configure the MixW software for the PTT option you will be using.

Keying of the radio PTT line: For serial port keying, the PTT signal is accomplished by high/low voltages on pin 20 or 4 of a DB25 connector or pins 7 or 4 of a DB9 connector. (These are the DTR and RTS lines). To key the radio PTT line from DTR or RTS a transistor interface circuit is required. This simple circuit will do the trick:

Basic PTT Circuit

P1

RTS

R1

2.2K

D1
1N414B

Q1
2N4401

To PTT

To GND

CONNECTOR DB9
FOR DB25 USE PIN 7 FOR GND
AND PIN 4 FOR RTS.

GND

Direct command to PTT on/off Via the PC - Radio command (CAT) interface:
On some models of Kenwood. Yaesu, Icom, and TenTec radios, the built in capabilities of the radio serial interface can be used for PTT keying. If your radio supports PTT using the CAT interface no additional hardware connections are required.

Sharing the PC-Radio command (CAT) serial port with the PTT circuit:
Many transceivers do not use the RTS and/or the DTR lines for CAT. In this case you can use the same serial port for both CAT and a PTT circuit. This will require wiring a DB9 or DB25 connector such that the required pins are wired to each of the two (CAT and PTT) interfaces (normally a level converter for CAT and an electronic switching circuit for the PTT). Then in the PTT & CAT dialog you will UNCHECK "PTT via CAT command" and in the Serial Port dialog you will select either RTS or DTR for PTT and set the other parameters as needed for the CAT interface.

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.
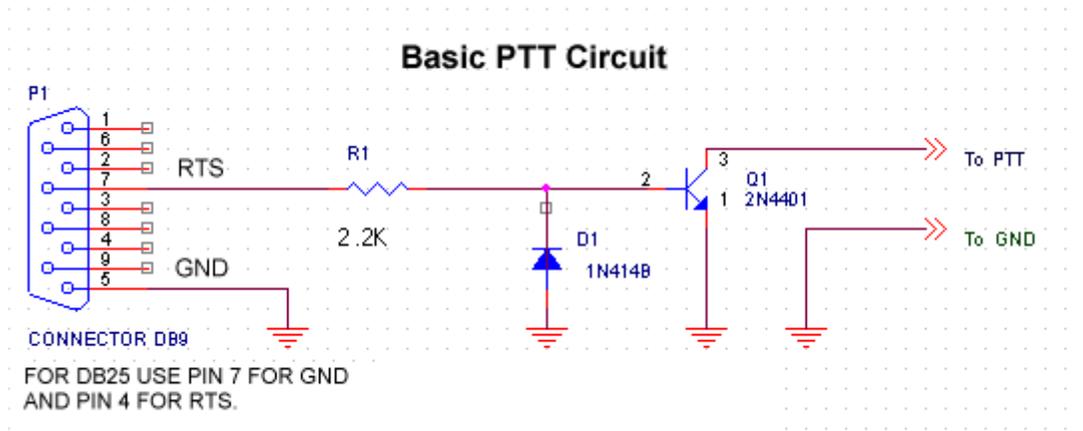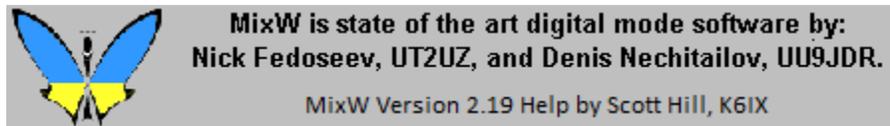
MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Configuring Macros

For a complete list of Macro Commands see the Appendices Section of the MixW Help file.

Macro commands can be combined with each other, or combined with text, to control many functions of MixW, your CAT equipped transceiver, or your TNC. They can be used to reduce the need for repetitive typing.

MixW supports different Macro groups for each mode of operation, which can be automatically loaded when you switch modes (called "local" macros). You can also have different sets of Macros in files, which can be configured for specific types of operation. For instance, you can configure one set for contesting, and another for rag chewing. These can be custom configured, saved, and then reloaded from the Macro Configuration Window. To optimize Macros for contest operation see the Contest Operation topic in the Appendices Section of MixWHelp.

MixW's Macro system is extremely flexible and powerful, however it will take a little time to understand how to configure macros to best match your operating styles. Macros can be added or edited four different ways:

- By right clicking on the Macro button
- By selecting Configure | Default Macros
- By Selecting Configure | Macros for this mode...
- By Selecting Configure | Macros for this contest...

Note: Macro commands must be typed in all capital letters. Text can be typed as upper or lower case. Lower case characters will automatically be converted to uppercase when transmitted for modes like RTTY and AMTOR, which only support upper case.

Simplified Macro editing instructions:
When you first start MixW you will see the following set of buttons across the top of the screen.
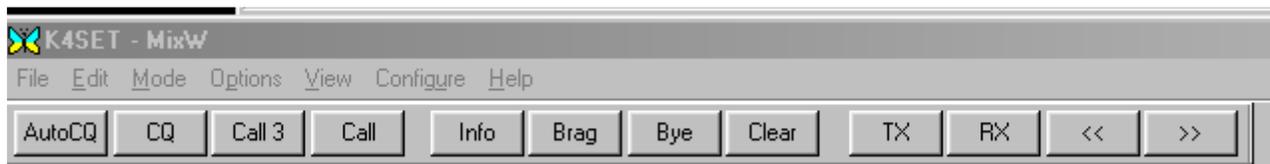
These buttons, which correspond to the F1 through F12 keys on the keyboard, are called **Macros** in MixW. If you click one of these buttons with the mouse or press the corresponding F key, it will cause a script of **Macro Commands** to be run. If you hold down the Ctrl key on the keyboard you will see a different set of macros which can be called with Ctrl-F1 through Ctrl-F12. Notice that some of the keys are blank, indicating that there is no script of Macro Commands assigned to that key. Twelve more macros can be created for Shift-F1 through Shift-F12, and twelve more for Shift-Ctrl-F1 through Shift-Ctrl-F12 providing a total of 48 macros for the F keys. The four different rows of Macro buttons can also be accessed by "rolling" the mouse wheel while the mouse is over the Macro buttons.

To view and/or change the F1 through F12 Macros, right (mouse) click the Macro (button). Right clicking the forth macro, for example, will bring up the following dialog:
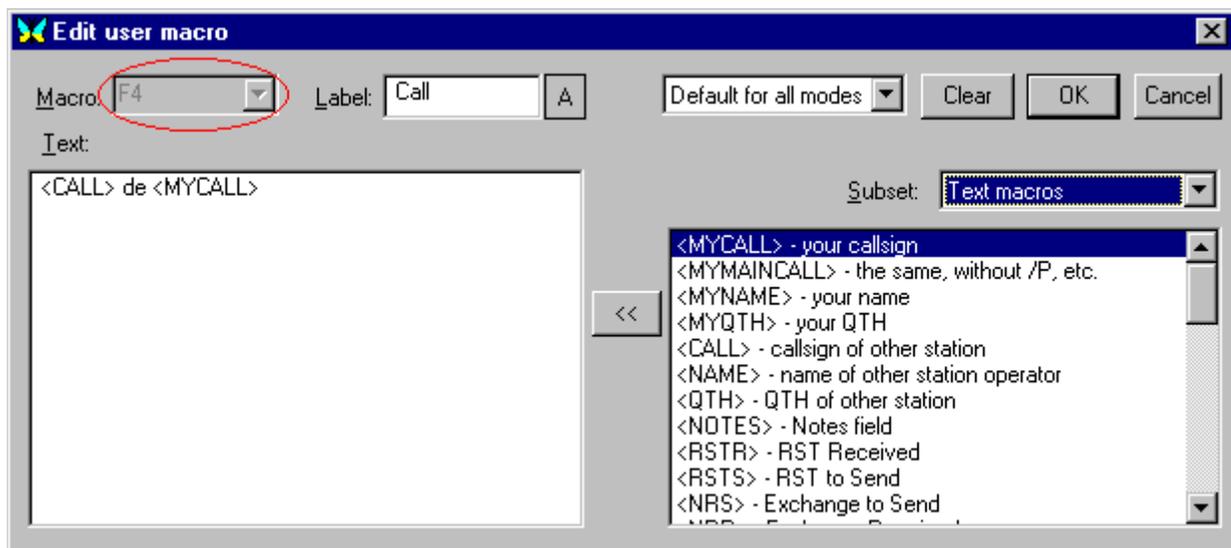
You can now edit this Macro's Label, as well as its text (script). You can also change the color of the button by selecting the small rectangle containing the "A" to the right of the Label box. All edit functions are available from this edit window with the exception of the Macro Key assignment (It is assumed you want this to be the key you right clicked on to bring up the window). There is a convenient

list of Macro functions and short explanations in the box on the right. Highlight the desired function and click the double arrow to move it into the desired location in the Macro text box.

This simple example in Macro location F4 is named "Call", and will return the standard 1 X 1 call sequence.

Macros can be modified to increase the automation of MixW. For example, the Call Macro above can automatically toggle MixW between transmit and receive modes by placing <TX> as the first command and placing <RX> as the last command, so Call would read, <TX><CALL> de <MYCALL> k<RX>. In this example, pressing F4 would cause MixW to go into transmit mode, send the other station's call once, followed by "de", send your call once, followed by "k" and then automatically return to the receive mode.

The forth item in the Edit User Macro dialog is a pull down text box which reads "Default for all modes" and indicates that the label and script that you enter here will become part of your Default Macros. Later you will find out about other sets of macros such as contest macros and mode specific macros.

There are several other types of macros which are not called by the F1 through F12 keys, and therefore cannot be edited using the right click method. You can call up a different Edit Window by clicking on Configure | Default macros, which will bring up the following dialog box:
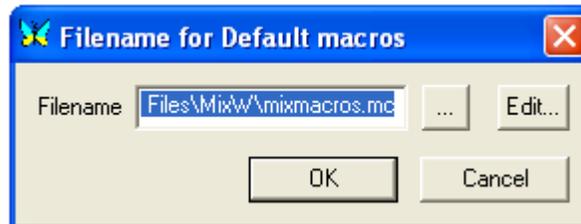
Click Edit to see the entire set of Default Macros. You should get the following screen.
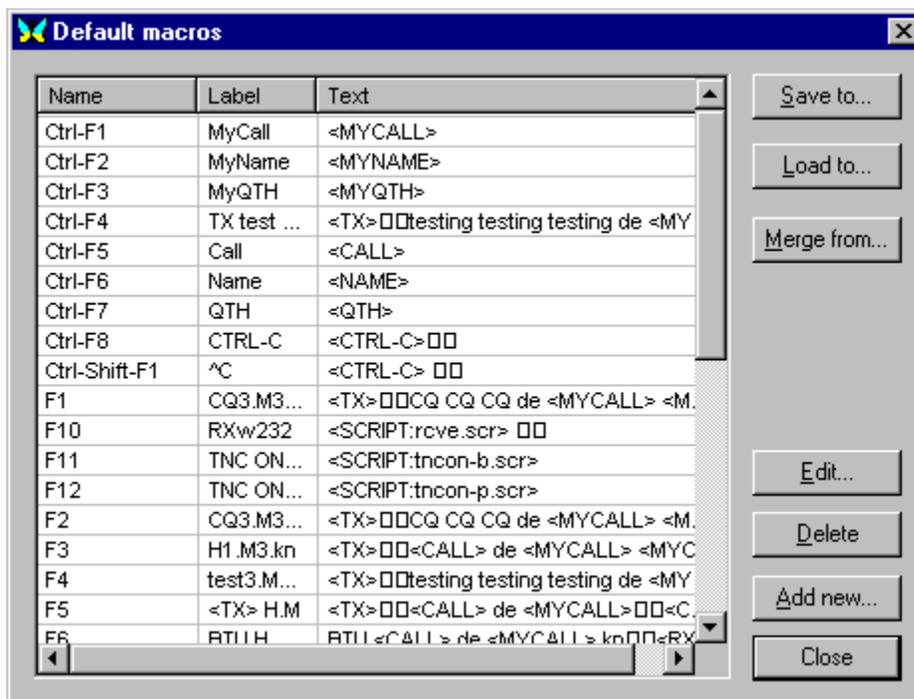
Double Clicking any of the Macro lines in this Window will bring up the Macro edit window. Notice that this edit window allows you to change the macro to a different F key or even to events such as On Start, On End, etc.
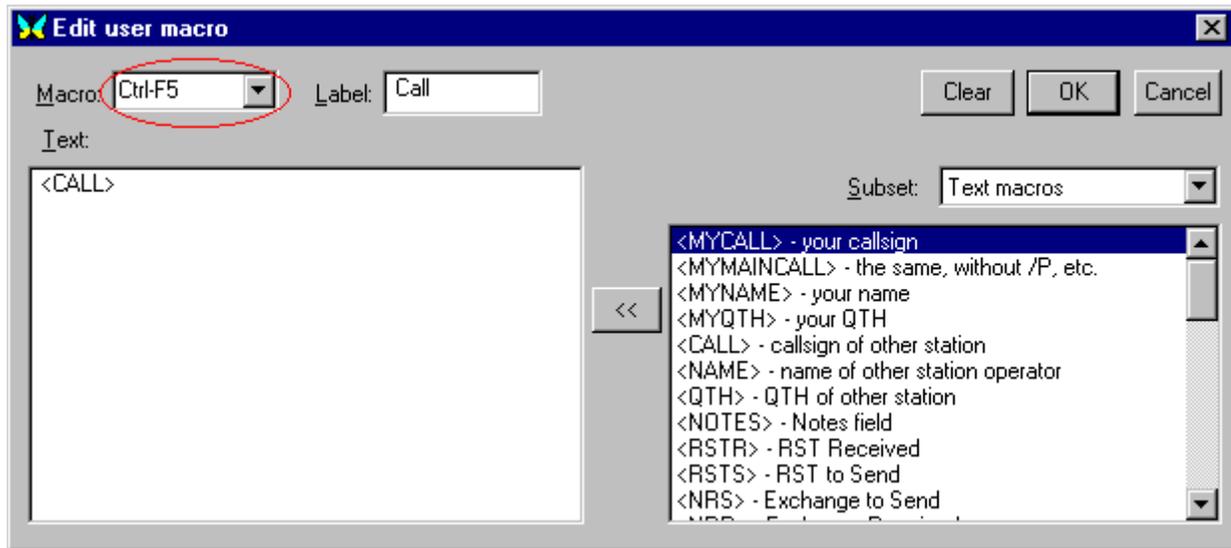
You can also add or delete macros from your Default Macro list as well as Load and Save this list to a file for later recall. This gives you unlimited use of Macros for every type of operation. Each group has a potential for 48 separate Macros assigned to specific F-keys and buttons, and there are several event macros available under "other Macros" as well. To see the "grey key" and event macro's look at the very bottom of the pull down Macro list box.
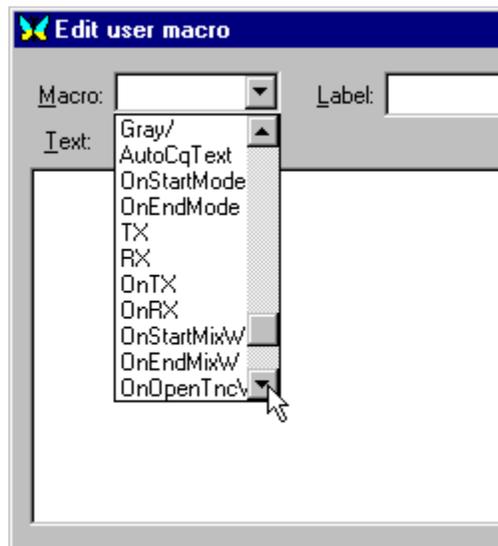
The Grey Key and Event macros will appear in the edit window as shown here:

F9	TX	<TX>
Gray+	MYNAME	<MYNAME>
OM	Empty n...	<INIFILE:friend.ini,HI,<CALL>>
OnAlarm	Alarm te...	<BEEP:ON>
OnCR	*	<TX><CURSOR:TX>

All of the things that we have talked about here which can be done with your MixW Default Macros can also be done with separate Macros for the different digital modes. This makes the use of application specific Macros almost limitless. The section below is written by one of the programmers of MixW to explain some of the more complex uses of macros.

MixW 2 Macros explained by Denis Nechitailov, UU9JDR (with minor editing by K4SET)
MixW 2 is supplied with a default set of macros. These macros are loaded from the "MixMacros.ini" file, which is located in your MixW directory, when MixW 2 is launched. This is the Default set of Macros used for all modes, meaning they are used regardless of which mode you are operating, unless you have configured specific mode macros that replace them.

You can choose another file to be your default macro file by selecting Configure | Default macros, which will bring up the complete list of default macros. Here you can add, delete, or edit each macro. You can also save this macro list to another file, or you can load a different list from a different file, which will then become your default macros. If you right-click on a macro in the control bar you can easily edit just the single corresponding macro, without having a big full list. Each macro has a label which appears on the corresponding button in the Control Bar, and a text which is placed in the TX window when you select that macro.

There are two general ways to use macros. The simple way uses a single set of macros at any given time. This set (or file) can be changed as outlined above, or it can also be changed on-the-fly using a macro. This is done by using the <MACRO:filename> macro. For example, you might like to configure another set of macros for a different language. For instance, your F5 key macro (using the default MixMacros.ini for the English language), might be the following:
Macro: F5
Label: Name
Text: My name is Eugene.
While in the Spanish version (MixMacrosSpanish.mc), your F5 key may look like this:
Macro: F5
Label: Nombre
Text: Mi nombre es Eugenio.
And so on.

We can configure MixW to quickly change between the English and Spanish macro sets by configuring a macro to change which macro file is active. This is achieved by doing the following: While using the English MixMacros.ini, at any unused key location (e.g. Ctrl-Shift-F1, for instance), place the macro:
Macro: Ctrl-Shift-F1
Label: Spanish
Text: <MACROS:MixMacrosSpanish.mc>
And in Spanish set (e.g. MixMacrosSpanish.mc),
Macro: Ctrl-Shift-F1
Label: English
Text: <MACROS:MixMacros.ini>

Now if you press Ctrl-Shift-F1 when you are using the English set, the Spanish set will be loaded (and vice versa).

Of course, this single default set of macros is not right for ALL the modes you operate, or for ALL situations. Sometimes, even switching macros by using the <MACROS:filename> macro does solve the problem. So, in addition to using the simple macro mode (single set of macros) MixW 2 is capable of using a secondary system (called the local system), which can integrate mode or contest specific macros into your default macros. This can also be used to integrate macros specifically configured for hardware TNCs.

Why does one need to use local macros? For example, you would not want to have a macro with the text RYRYRYRYRYRYRY on the screen in SSB mode, even though this might be very helpful in the RTTY mode. You would also not want to have your recorded voice calling "CQ CQ etc.." in the PSK31 mode, while this could be helpful in the SSB or FM modes.

Using the local macro system MixW2 can automatically switch to a set of macros that you have custom configured for a specific mode, or even a specific contest (using the MixW 2 Contest Mode). MixW 2 can also automatically load TNC command macros (for instance, to switch baudrate "on-the-fly", etc.) when you use hardware TNCs.

For example, you may want to use a separate set of macros for BPSK31. To do this, select the BPSK31 mode from mode menu, then click Configure | Macros for this mode... Then, enter the name of the file you want to use for this mode (e.g. BPSK.mc). Now, whenever you switch to the BPSK31 mode, you will have these special BPSK macros on the screen.

Note: The "Merge macros" item from the "Configure" pull-down menu tells MixW how you want the local and default macros to be merged. If this is left unchecked, you will see only the mode/contest/TNC specific macros. If you check the "Merge macros" option, you will see your local macros merged with your default macros. The default and local macros are merged using a simple rule: If a macro (for example, for the F5 key) exists in the local set (BPSK.mc in this example) it will be used. If not, the F5 macro from default set will be used.

Merging macros is very useful when you want to add just a few macros to the default set. For example, if the F2 key from the default set contains
<TX>
CQ CQ CQ de <MYCALL> <MYCALL> <MYCALL>

You might like to define an F2 macro for the RTTY mode like this:
<TX>
RYRYRYRYRYRYRYRYRYRYRYRY
CQ CQ CQ de <MYCALL> <MYCALL> <MYCALL>

Most likely, the same local macro files can be used for the BPSK31, QPSK31, and the FSK31 modes. RTTY and AMTOR can also share the same local macro file, and the phone macros for SSB, AM and the FM modes can be shared as well.

You can edit these local macros through Configure | Macros for this mode (this will load the full list of macros). When you are using separate macros for each mode (or for a groups of modes), right-click on one of the keys on the Control Bar to edit this macro. This will show the same Edit user macro dialog box, but now you can choose if you want this macro to be used for the current mode by selecting "For

this mode", or it can be set to use it as a default macro for all modes by selecting "Default for all modes".

Suppose you don't have separate macros for RTTY yet, and you want to add RYRYRYRY for the RTTY mode only (as shown in the example above). Here is how to do that:
1. Switch to the RTTY mode (from Mode menu).
2. Go to Configure | Macros for this mode, and then enter name for the RTTY mode macro file (e.g. RTTY.mc). If there is no file by that name yet, when you press the Edit button at the Filename for RTTY macros dialog, you will be asked if you really want to make a new file. Say yes. At the RTTY macros dialog, you can add the F2 macro, but close the dialog and press OK on Filename for RTTY macros dialog.
3. If the "Merge macros" option from Configure menu is disabled, you will see the blank keys on the Control Bar (that is because you are using separate macros for RTTY, but no macros have been defined yet). Now, enable "Merge macros" from the Configure menu. Now the Control Bar shows the default macros.
4. Right-click the F2 key and select "For this mode" in the Edit user macro dialog box. Then add the "RYRYRYRYRYRYRY" line and press OK.
You now have RYRYRYRYRYRY line on the F2 key while using the RTTY mode, but not in any of the other modes.

To delete a local macro; the macro we just made for the RTTY mode for instance, open the Edit User Macro dialog for the F2 key while in the RTTY mode (it now indicates "For this mode"), and clear the macro with the Clear button. Press OK and now F2 macro with RYRYRYRY is deleted from RTTY set.

TNC Macros: When using TNC, the TNC's own file (it's name is entered into TNC Modes dialog from Mode | TNC modes settings menu) is used as a local macro file. Merge Macros can also be used if you want to merge TNC's macros with the default macros.

Using macros with TNCs: TNC operations in MixW 2 are based on two general principles:
1. TNC works in terminal mode (not host mode).
2. TNC state (mode, baudrate, TX/RX state, etc.) is controlled by using macros.
Usually you will have different sets of macros for different modes on the same TNC, and there are several steps that should be done for each set. First, you must define the macros to initialize the TNC and place it into the mode you want to operate (and de-initialize it at the end of mode).These two macros are used for this purpose:

OnStartMode
OnEndMode

For example, to operate PACTOR using a KAM+ TNC, you may define them like this:
Macro: OnStartMode
Label: Start (or whatever you choose)
Text: <HIDETEXT><AUDIOFQ:2200>
<SHIFT:200> <CTRL-C>X
PACTOR
<SHOWTEXT>

Macro: OnEndMode
Label: End (label does not matter)
Text:
<HIDETEXT><CTRL-C>X

<SHOWTEXT>

The first macro sets the center audio frequency and shift to draw the cursor at Waterfall/Spectrum window, then it sends "Ctrl-C" and "X" characters to TNC (to make sure it's placed into command mode), and then sends "PACTOR" command to place TNC into PACTOR mode. The second macro just places TNC into command mode. After defining OnStartMode and OnEndMode macros, re-define the TX and RX macros that are used to make the TNC transmit or receive. For PACTOR using the KAM+, they may look like this:

Macro: TX
Label: tx (label does not matter)
Text: <HIDETEXT><CTRL-C>T<SHOWTEXT>

Macro: RX
Label: rx (label does not matter)
Text: <HIDETEXT><CTRL-C>E<SHOWTEXT>

The first macro sends "Ctrl-C" and "T" characters (to transmit), and the second one sends "Ctrl-C" and "R" to receive. And now if the <TX> or <RX> macros are used in any other macro, like F2 with "<TX>CQ CQ CQ...<RX>" text, then by pressing F2, the TNC will transmit "CQ CQ CQ..." and then go back to receive.

Other macros to connect, disconnect, etc. can also be defined using these methods.

Contest macros: You might like to have another set of macros (with short "CQ CQ TEST" serial numbers etc..) for contests. At the Contest Settings dialog (choose a contest from View | Contest mode | then highlight the contest and select the Edit button) then enter a name of the Macro file you want to use for this contest (and also check the Merge macros check-box).

Now, a combination of 3 sets of macros is used: macros for the specific mode, macros for the specific contest, and your default macros. Contest macros are only active when View - Contest mode - On menu is checked.

Configuring Additional Macro Keys: There are several keys which can be used for containing macros as well as the function keys, but they are not shown on the control bar, so these keys can only be edited through the full list (either the default list, the macros for this mode list, the TNC macros list, or the contest macros list).

At the Edit User Macro dialog, select (or enter) the hot key name in the Macro field. There are 5 additional keys that are supported now:
Ins
Gray+
Gray-
Gray*
Gray/
Please note that these names are case-sensitive.

The "OnStartMode" and "OnEndMode" macros are executed when you start or end a mode. For example, if you have the separate set of macros for SSB, you can define OnStartMode to turn on a Notch filter, and OnEndMode to turn it off. Now if you switch to SSB, the filter will be automatically turned on.

Calling a macro from a macro: It's also possible to call a macro from another macro. For example, if you have the following configured in the F2 key macro:

<TX>
CQ CQ CQ de <MYCALL> <MYCALL> <MYCALL>

You might like to use this same text for your Auto CQ. To do this, just place <F2> in the Auto CQ, instead of the Auto CQ text. Now AutoCQ will play the F2 text. You cannot call a macro from itself, however, if you try you will be warned about this when you try to run it. Moreover, **you may call a macro anything you want.**
For example, you can define a macro like this:
Macro: POWER
Label: (Anything you choose, it will not appear anywhere).
Text: 40
(This will not be shown on the Control Bar because it is not assigned to a specific key)
Now, this is used with the other macro as follows:
Macro: F6
Label: Brag
Text: <CR>The power is <POWER> <POWER> watts.<CR>
This uses the value that is entered into the POWER macro, and inserts it into the text for the brag macro. To change the power macro on-the-fly, choose an unused key (e.g.Ctrl-Shift-F2) and fill it with <EDITMACRO:name> like this:
Macro: Ctrl-Shift-F2
Label: myPWR
Text: <EDITMACRO:POWER>
Then if you press Ctrl-Shift-F2, it will bring a dialog box with the value 40 in it. Replace the 40 with 20 (for instance) and press OK. Now your F6 key will yield the following:

power is 20 watts

Favorite Macros from the MixW beta test team, and others who have written in:

From Richard "Griff" Griffin, NB6Z
"SK"
<CALL> de <MYCALL> SK at <TIME><CWID><RXANDCLEAR><SAVEQSO>

"BTU"
BTU <NAME>... <CALL> DE <MYCALL> K <RXANDCLEAR>

"CALL"
<TX><CALL> <CALL> <CALL> de <MYCALL> <MYCALL> <MYCALL> K
<RXANDCLEAR>

"RST"
Thanks for report from <QTH>; you are <RSTS> <RSTS> here in
<MYQTH>.

From Nick Fedoseev, UT2UZ
Use <LOCKTX> in CQ macros:
<LOCKTX><TX>CQ CQ CQ de <MYCALL> <MYCALL>
<RX>
Use <UNLOCKTX> in Search/Pounce macros:

<UNLOCKTX><TX><CALL> <CALL> de <MYCALL> <MYCALL> <MYCALL> pse k <RX>

While calling DX in pileups I need to send my call several times (from one to five times. I use following macro:
<MYCALL> <TX><RXE>
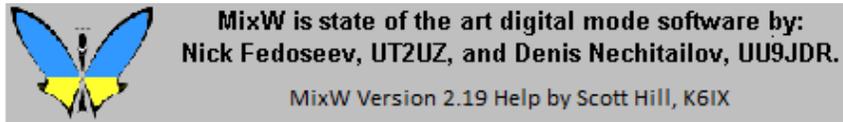If I press according button four times, MixW transmits "UT2UZ UT2UZ UT2UZ UT2UZ " and switches to RX.

From Dick Thompson, WB0DUL
Many times, we all type something like "Well Scott, the temp here is 60 degrees F and is supposed to stay that way for..." and so on.

I programmed my F12 key to display ºF when I hit it. So When I type in the number 60 (or whatever it may be, it looks like this:
Well, Scott, the temp here today is 60ºF and....

To create the "º" character, choose an empty macro. Put the cursor in the text box. Then, while holding down the Alt key, hit 0186 on the "keypad". The º will appear. Just type the F (or C for centigrade) after it, name the Macro Temp and save it. Just hit that key (in my case the F-12 key) when you want to insert ºF or ºC after a temperature.

MixW is state of the art digital mode software by:
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MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Operation

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1. **General Operation** - for all modes

2. **File Menu Items** - short descriptions

3. **Options Menu Items** - short descriptions

4. **View Menu Items** - short descriptions

5. **Using the Status Bar** - essential how-to

6. **Logging and QSLing** - essential how-to

MixW is state of the art digital mode software by:
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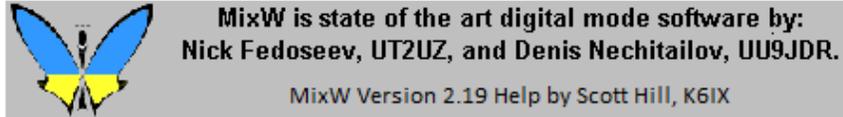
MixW: General Operation
_____

NOTE: There are TWO DIFFERENT MENU LAYOUTS AVAILABLE IN MIXW. To use this help system your menus should look like this:

MixW Help uses ONLY LAYOUT 1. If your menu items are different than the ones shown above select: View | Menu and choose Layout 1.


_____
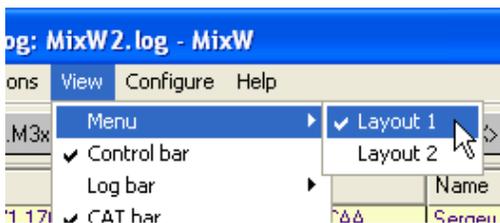
Read these general instructions first to get familiar with MixW operations , then look in the Digital Modes section of this help file for the specific mode you want to operate.
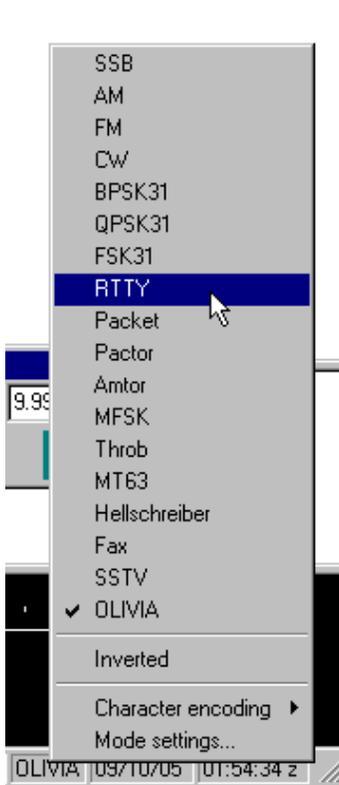
Mode selection
Select the mode you wish to operate by clicking Mode | <your choice of mode>:
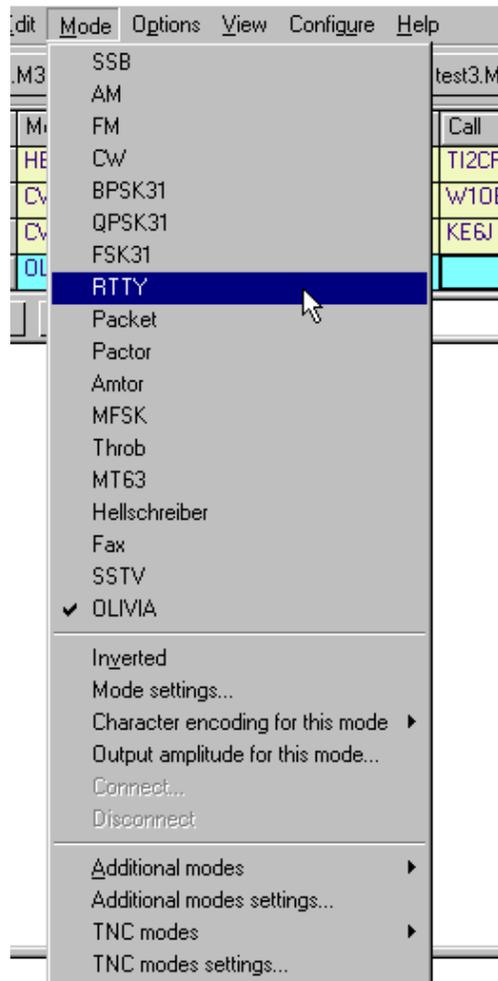
Notice that the status bar will change according to the options and features specific to the mode you have selected, and the mode will be indicated in the mode box. For instance, IMD is only relevant in the PSK31 modes, while Connected or Disconnected is only relevant for Packet:
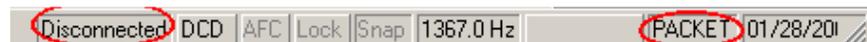
You can also switch modes by clicking on the mode box in the status bar and selecting the mode you wish to operate from the pop up menu:
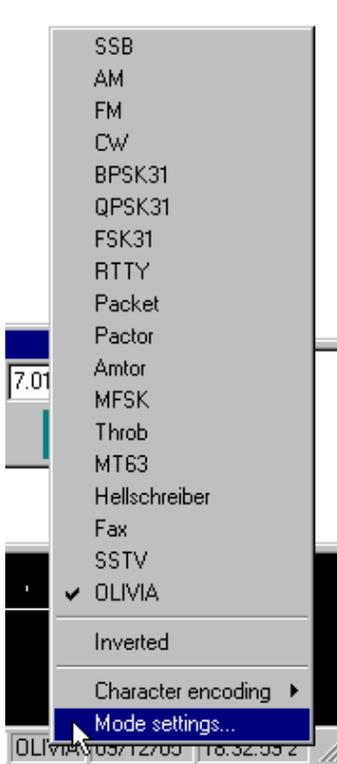
Mode Settings
Each mode in MixW has an individual Mode Settings dialog box which can be seen by first selecting the mode, and then selecting Mode | Mode settings...
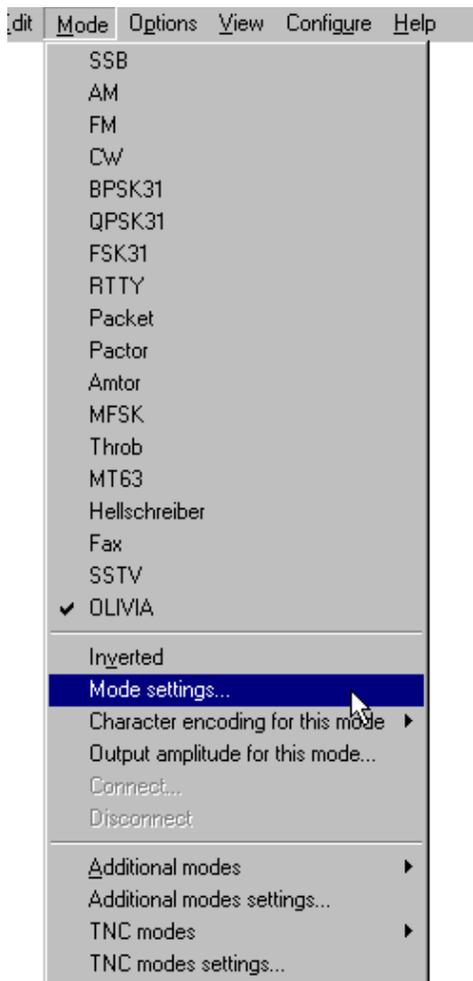
Clicking on the mode box in the status bar, and then selecting Mode settings... is another way to access the mode settings dialog.

The mode settings dialog can be accessed with the MACRO <MODESETTINGS> from one of the F-key Macros. Many of the settings in each dialog can also be set from Macros as well.

Your mode settings will vary depending on the mode of operation. For instance in RTTY, you can set the shift, the baud rate, and inversion, which are not relevant options to the PSK31 mode.

Inverted:
Note: This feature works differently in MixW than most other SoundCard digital programs, so please read and understand the information about inversion in the Configuration Section.

Receiving
While tuning instructions are somewhat mode specific and therefore covered in the individual mode operation topics, there are several procedures and techniques relevant in all modes.

To tune a signal left click the mouse pointer on the signal in the waterfall or spectrum display. You should start seeing text in your receive window. You can fine-tune the cursor location by holding down the control key and using the right and left arrows keys.

Seek
Stations may also be tuned in by assigning the <SEEKLEFT> and <SEEKRIGHT> macros to individual function keys, preferably single-finger keys. Pressing the key assigned to <SEEKRIGHT> will cause the cursor to jump to the next signal to the right of the current cursor position. Pressing the key assigned to <SEEKLEFT> will cause the cursor to jump to the next signal to the left of the current cursor position. Seek will send the cursor to any signal strong enough for Seek to detect,. If the cursor seems not to move, there may not be a detectable signal in the direction of Seek. If Seek passes the station you want to tune, or tunes to one side of the station and not in the middle, just press the Seek button to pass the station and approach it from the other side. The default keys for Seek are F11 and F12, labeled << and >>.

When Options | Arrows for Seek is checked, the left and right arrow keys can be used for the Seek function, releasing F11 and F12 for other one-finger macro key configurations. However, if the left and right arrow

keys are used for Seek, they are not available for editing the TX and RX windows.

When Options | Continuous Seek is checked, Seek will search continuously for a signal and stop when it finds one. To manually stop Continuous Seek, just press any Seek key.

Bookmarks

A place-holder called a Bookmark is available on either the spectrum or waterfall displays. You must first enable bookmarks by clicking on View | Spectrum | Bookmarks. Then, to place a bookmark at the cursor position right click in the spectrum/waterfall window and select "Toggle Bookmark" from the pop-up menu. A lettered bookmark will appear at the diamond cursor position at the bottom of the Window. Pointing to any bookmark, clicking the right mouse button, and again clicking the "Toggle Bookmark," will remove a bookmark.
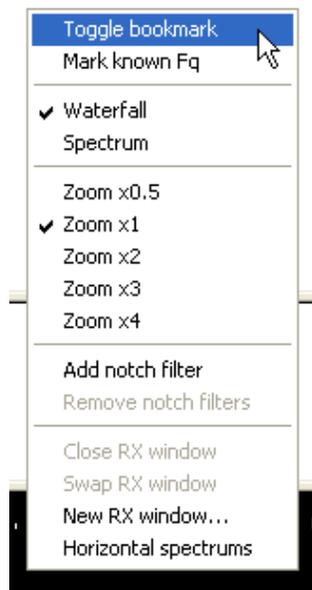
To return to a book-marked frequency, point to the numbered bookmark and click the left mouse button to position the diamond cursor there, or click the right mouse button to position the triangle cursor there (see Multiple RX Windows below).

You can capture the station's call sign for a bookmark by double clicking the call in the receive window (the call will also be captured automatically is many cases). The station's call will now appear in the bookmark when tuned to that frequency.

A special "permanent" bookmark can be placed at known frequencies by adding an entry to the KnownFqs.dat file. Known frequency bookmarks are colored grey.

When the Bookmark macro is assigned to a key, pressing that key will place a bookmark at the diamond-shaped cursor's position.

Clear

Text in the RX window can be cleared by right clicking in the window and selecting Clear all from the pop-up menu, or by using the <CLEARWINDOW> macro, which is configured as one of your default macros (F8). Simply place the cursor in the RX window and then click on the Clear macro button (or press the F8 key).

Multiple RX Windows

CTRL-clicking the left mouse button in the receive window will put MixW into dual RX mode and open a

second RX window named RX (1). If you are pointing at a signal when you CTRL-Left click, you will start copying that station in the RX (1) window immediately. If you already have a second RX window open CTRL-Left click will move the RX (1) triange cursor to the signal that you click on.

Right clicking in the spectrum window, and selecting "New Receive Window" will also launch the second receive window, as well as a third, fourth, fifth etc... There are unlimited RX windows available. Here are three QSOs being copied simultaneously in the Main, RX (1), and RX (2) windows. Note the cursor locations of each on the waterfall display:
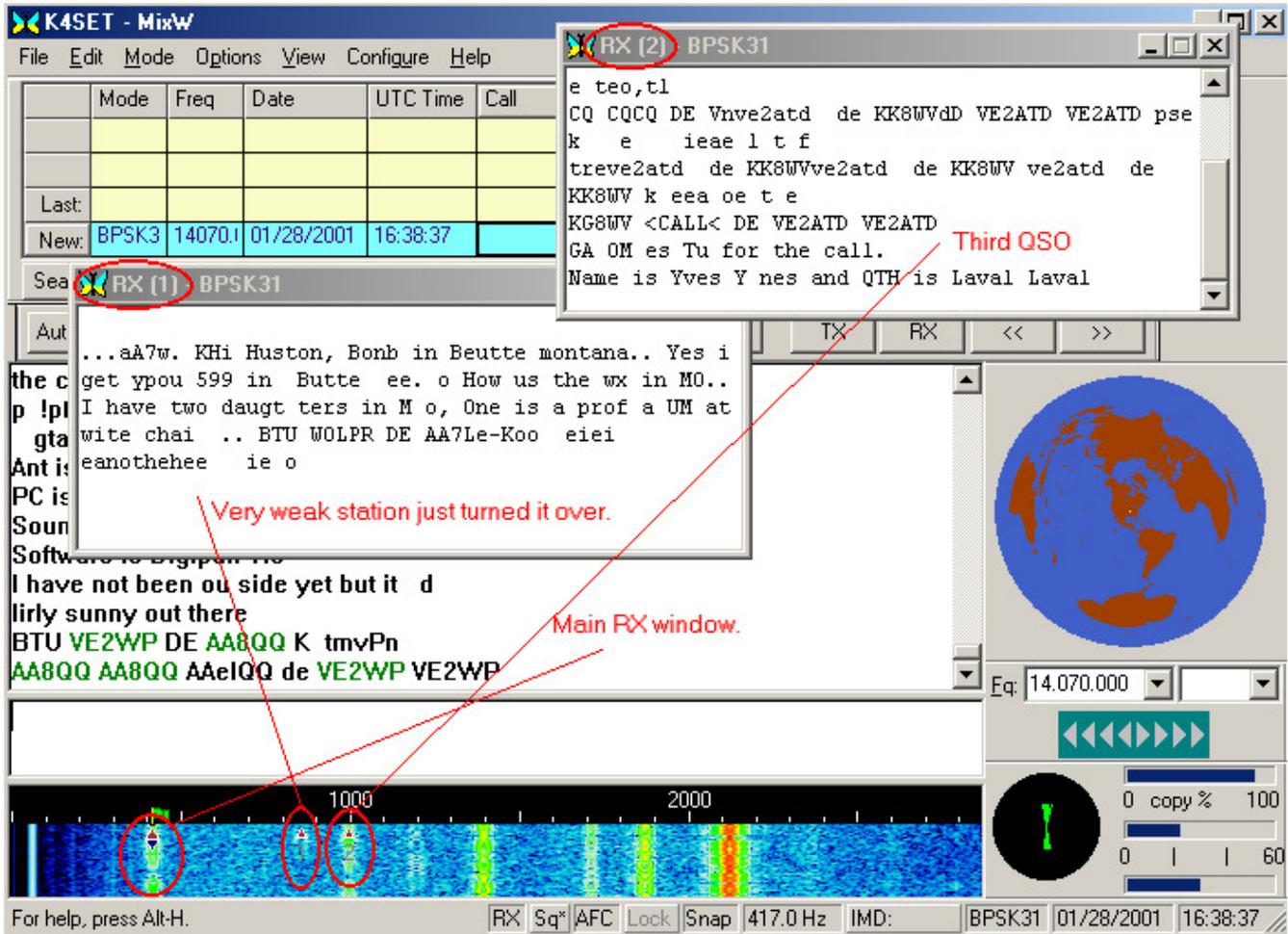
The spectrum window cursor for RX 1, 2, 3 etc... is a triangle (instead of a diamond) with the RX window number directly below the triangle.

You can swap the text between the Main RX window and the RX (n) window by right clicking in the RX (n) window and selecting Swap from the pop-up menu.

When MixW is in muliple RX mode, it may be returned to single RX mode by closing the extra receive windows.

Positioning and Sizing Windows
NOTE: Before making changes to your MixW layout it is important to back up the MixW2.ini file so you can revert to your previous setting if necessary.

Pointing to a vacant space on the Control Bar, Log Bar, Tuning Indicator, or World Map and holding the left mouse button down while moving the mouse makes it possible to reposition and dock any of these features.

An outline of the feature will appear when the mouse is first moved, and when that outline shrinks, it indicates a position where the feature may be docked by releasing the mouse button. The docked position of the feature will be remembered from session to session. These windows can also be undocked by double clicking on an empty space in the window.

The number of rows visible in the log bar can be changed. Double click in a blank area of the log bar to undock it. Resize the log bar for the number of rows you want. Double click the log bar again to redock it.

Pointing to a window separator will cause the mouse cursor to change to a small pair of parallel lines, and pressing the left mouse button and keeping it pressed will make it possible to resize the Spectrum, TX or RX windows. Releasing the mouse button will leave the window in the resized position.

The following screen indicates one approach to screen layout using the various MixW displays:
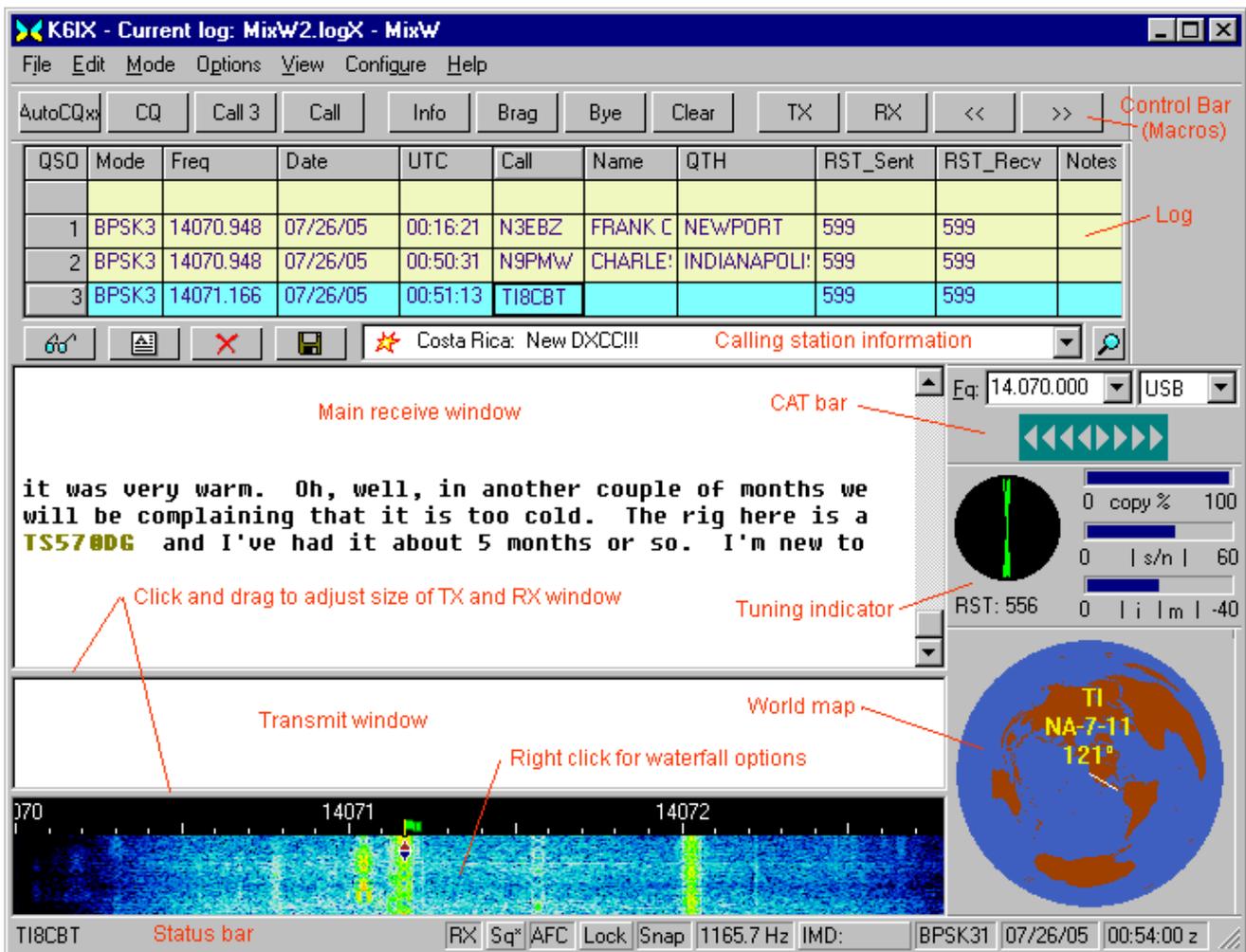
Icons in the Calling Station Information window.
Small icons are shown to the left of the station information which indicate the DX status of the station. The status is also explained in the text. A star indicates a new DXCC entry, a star with the letter M indicates a new country in the current mode, and the letter B indicates a new country on the current band.

Icons in the MixW receive window.
Small icons can be shown along with the text in the MixW RX window. These icons are in the MixW | ICONS folder and are configured to appear after a text word by placing the word and the icon name in the MixW | icons.cfg file.

You can add your own icons by putting your icons in the ICONS folder, and then identifying the icon in the icons.cfg file. Open the icons.cfg file with Notepad (or some other text editor) and follow the format used for those entries already in the file. You can create your own icons by downloading one of the many Icon Editor programs available on the internet.

Remember that **these icons are visible only in the RX window of the station where they have been created and stored**. If you see them in your RX window it is because they are in **your ICONS folder.** The other station will see them only if they are also in **his/her ICONS folder.They are not sent over the air.** You can test your icons by running MixW without the transceiver on. Type the words for which you have made icons into the TX window and then switch MixW to TX. As the text is copied into the RX window you will see your icons. In the illustration below you see that I have added an icon which is a large "X", and equated it to the text prosign "sk".

Notch Filters in the Spectrum/Waterfall window.
To set an Audio Notch Filter, right click in the Spectrum or Waterfall window at the frequency to be notched and select Set Notch Filter from the menu. Multiple filters can be set using this method. To clear **all** the filters you have set, right click anywhere in the Spectrum/Waterfall window and select Clear Notch Filter. Filters can not be cleared individually.
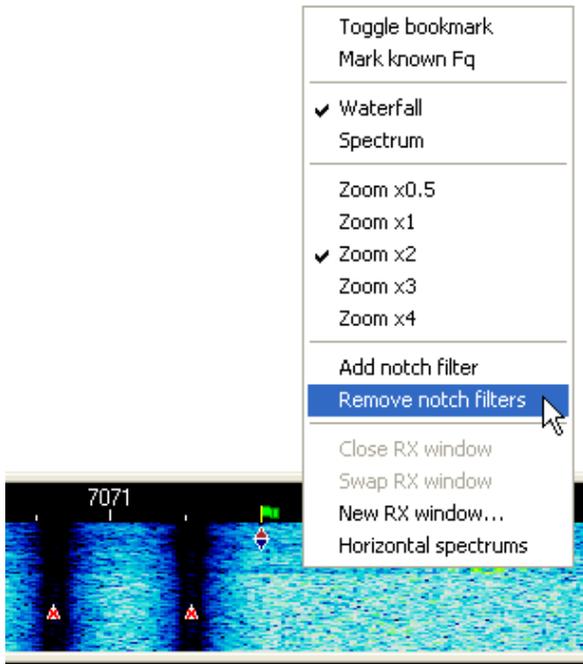
Grid Location Distance and Azimuth.
Hovering the mouse pointer over a Grid Location n the RX window will show a tool tip with the Distance and Azimuth.

Transmitting
The active cursor for transmit is denoted by a green flag on the dial scale above the cursor. The transmit frequency may also be locked in place. When locked the flag will change to red color, warning you to notice the actual transmit frequency.

To transmit to a station, first tune it in, and then type outgoing text in the Transmit Window, (the smaller window between the Receive Window and the Spectrum Window). Press the TX/RX button on the status bar (or one of the other TX/RX toggles) 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, click the TX/RX button again with the mouse. Pressing ESC (on the computer keyboard) TWICE will abort transmission and return MixW to receive mode, but the last several characters typed will not be transmitted. For this reason, the TX/RX button should normally be used to switch from transmit to receive.

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

Text in the TX window may be edited with the standard Windows editing functions while in the TX mode. **Enabling View | Underline Sent Text** will prevent you from inadvertantly trying to edit text that has already been sent (some users report, that on their systems, View | Underline Sent Text **must** be enabled to edit in the TX window). **NOTE:** After editing in the TX window be sure to put the cursor at the end of the text you want to send. TX will stop if the cursor is encountered.

Text in the TX window can be deleted or Cleared by right clickling in the TX window and selecting Clear all, or by using the <CLEARWINDOW> macro, which is configured as one of your default macros (F8). Place the cursor in the TX window and then click on the Clear macro button (or press the F8 key).

TX Operation with Multiple RX Windows
To avoid the possibility of transmitting to the wrong station, MixW supports only one transmit frequency. You can switch TX (the diamond cursor) to any RX window by swapping the RX (n) window with the main window.
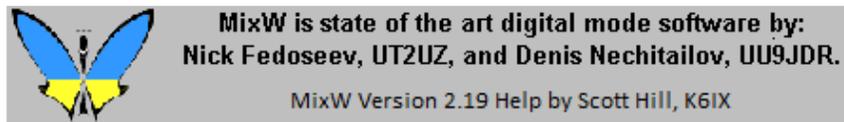
TX Lock
Lock can be used for what is normally referred to as "Split frequency" operation, or transmitting on one frequency and listening on another. In order to set the transmit frequency, position the diamond cursor to the frequency where you want to transmit and click Lock on the status bar. Then move to the frequency where you want to receive or where there is a station of interest and left click to start RX in the normal manner. The receive frequency will show a red triangle cursor and the transmit frequency will show an inverted blue triangle with a red flag.

To unlock TX, click the Lock button on the status bar again. The TX frequency will revert to your current RX frequency and the flag will turn green.

Operating With Macros
The MixW Macro Buttons in the Control Bar allow for the automation of almost all frequently used operating procedures. The Macros can be executed by using the keyboard F1 thru F12, Ctrl-F1 thru Ctrl-F12, Shift-F1 thru Shift-F12, or Ctrl-Shift-F1 thru Ctrl-Shift-F12 keys. The macros can also be executed by (mouse) clicking on the buttons in the control bar in which case the different rows can be displayed before clicking by pressing the Shift, Ctrl, or Ctrl-Shift keys, or by rolling the mouse wheel while the pointer is hovered over the control bar.

For information on customizing Macros see the Configuring Macros topic in the Configuration and Set Up section,

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MixW Version 2.19 Help by Scott Hill, K6IX

MixW: File Menu Items
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A short description of some of the selections available from the file menu:

Print (CTRL-P) Prints the contents of the Receive window to the printer. **Note:** The cursor MUST be in the RX window.

Print Preview: Displays an image of the printed page.

Print Setup: Displays a dialog for setting printer parameters.

Send File: Transmits the contents of a specified text file. **This must be text only!** Be sure to always "close" your file by saving it to disk.

Send Picture: Displays a dialog to send a picture in MFSK

Search in log file (ALT-R): Displays the "Search in Logfile" dialog allowing you to search for any string in the log.

QSO details (ALT-D): Displays a dialog showing all fields in the log for the selected Log bar QSO. This

dialog also allows adding a new call area, or sending an eQSL.

Remove QSO (Alt-O): Deletes the selected QSO.

Restore removed QSO Restore the last deleted QSO.

Save QSO data (Alt-A): Saves the contents of the active log entry.

Lookup call (Alt-K): Looks up the active call in the log and displays all previous contacts.

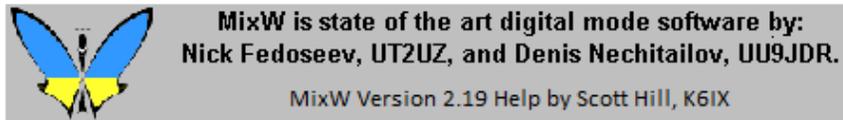**Import ADIF:** Imports a log in ADIF format. The ADIF format is common to many log programs, and can be used to exchange logs between different programs.

Export ADIF: Exports a log in ADIF format for import to another program.

Merge: Will merge two MixW2 logs together.

RX Log: Opens or closes a file to save the receive window text data.

Sound: You can save the last twenty seconds of audio to a wave file. This is useful in cases were you want to demonstrate certain audio characteristics. Files can be saved, and later played back for reception and display.

Exit: Exits MixW

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MixW: Options Menu Items
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AFC
When AFC is checked, MixW will keep a station tuned even if it drifts. It is recommended that you keep AFC checked unless it prevents you from tuning to a desired station. Uncheck AFC if a nearby strong station makes it impossible to tune to a weaker station.

Lock
Lock allows you to transmit on one frequency and receive on another. When Lock is selected, the TX frequency is fixed at the position of the active cursor, and the flag above the cursor changes to red. When LOCK is NOT selected, transmission will occur on the same frequency as receive, as indicated by the diamond cursor, and the flag above the cursor will be green.

SNAP
When Snap is checked, MixW will automatically find the correct tuning point for a station. Uncheck Snap if a nearby strong station makes it impossible to tune to a weaker station.

Squelch
When squelch is checked, only signals above the Squelch threshold will be printed. This can be used to prevent random characters created by noise from being printed.

Squelch Threshold
Displays a level control for the Squelch threshold. The threshold can be adjusted as high as possible to prevent noise from printing as random characters but still allow print of a desired station. Selecting Mode |

Squelch threshold...will display a mode specific dialog in which AFC, Lock, and Snap can also be set.

When the screen-printing is "squelched", or not printing, because the signal is below the squelch threshold, the "Sq" shows on the status bar without the " * ". If MixW appears to stop decoding, be sure the squelch threshold is not set too high. For reception of weak signals, it is usually best to turn the squelch completely off. This will result in "garbage" print some of the time, but whenever the signal becomes strong enough that copy is possible, the text will appear on the screen along with the garbage characters.
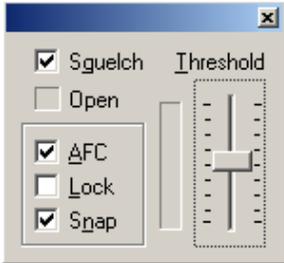
RX Selecting RX places MixW in the receive mode.

TX Selecting TX places MixW in the transmit mode.

TX and RX can also be toggled by using the pause/break key on the computer keyboard, by clicking on the RX/TX box in the Status Bar, by using the TX and RX Macro buttons, or by using the <TX> or <RX> Macros in a Macro script.

Continuous Seek
When Continuous seek is checked, Seek will continuously look for a station until one is found and stop on that station. To stop Seek, just press any Seek button. If a station fades below the Seek threshold, Continuous Seek does not start seeking for another station. This is so you can stay on the station's frequency and continue to copy whatever you can, even though it is fading. To restart Continuous Seek, just press one of the Seek keys or buttons.

Arrows for Seek
When Arrows for Seek is checked, the left and right arrow keys can be used for Seek, but the arrow keys are then NOT available for editing the RX and TX window. Uncheck Arrows for Seek to make the left and right arrow keys available for RX and TX window editing.

Scan | Start Scan
When selected, Scan will cause MixW to Seek out a station, stop on that station, record the time and tone frequency of the station, and print that station on the screen for a determined amount of time (dwell). After printing for the selected dwell time, MixW will proceed to the next detectable signal and repeat the process. **Note: Snap must be on for Scan to work.**

Scan | Stop Scan
Selecting stop scan will stop the Scan process. Scan may also be stopped by selecting a station or frequency with the mouse. Clicking Scan | Start Scan again will start the scan from the current location.

Start Scan and Stop Scan can also be controlled by macros, so <STARTSCAN> and <STOPSCAN> may be assigned to function keys or put into a macro script.

Scan | Scan properties
Selecting Scan properties will bring up a dialog for setting the way Scan behaves. "Only once" will stop Scan after encountering the first detectable signal, Dwell sets the staying (to print) time in seconds, and Continue on squelch resumes scanning when the signal level falls below the squelch threshold, Checking Time Marks

or Frequency Marks, tells MixW to display the time of the station print or the frequency of the station print, or both.
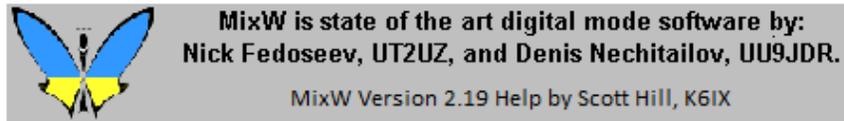
MixW: View Menu Items
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View is where you select which of MixW's various control windows and operating aids are displayed on the screen, and in several cases, how they are displayed. Simply select (check) the ones you want displayed.

Menu
MixW has two different Menu Layouts. MixWHelp uses only Layout 1. If you prefer Layout 2 while operating, you can easily change to Layout 1 to follow the information in MixWHelp, and then change back to Layout 2 before you continue operating.

Control Bar
When checked, the Control Bar will be displayed. The Control Bar may be moved and repositioned (docked) by pointing to an empty area of the bar, holding the left mouse button down, moving the outline of the bar until it changes shape, and then releasing the mouse button. The usual alternate docking location for the Control Bar is just underneath the Spectrum Window.

Log Bar
Gives access to several settings for contest logging, and log text colors.

CAT Bar
Displays curent Side Band and Frequency settings for use by the Waterfall and Logging functions.

Tuning Indicator
When checked, a phase display of the received signal will be shown. This will display as multicolored radial lines, like spokes of a wheel, when MixW is not tuned to any signal. When tuned to a BPSK signal, there will be only two vertical, or nearly vertical, spokes displayed. When tuned to a QPSK signal, there will be two vertical spokes and two horizontal spokes forming a cross, and when tuned to a FSK31 signal, two horizontal spokes will be displayed.

World Map
A World Map will be displayed showing your station as a yellow dot in the location you configured under Personal Data. A line will appear indicating the location of the call in the active QSO entry of the Log. If you have configured MixW to use Rotor control, the heading of your antenna will also be displayed, and it will move with your bearing when operated through MixW.

DX Cluster
The DX cluster window can be configured for packet or internet DX information.

Callbook dialog
For this option to work, a callbook must first be configured by selecting Configure | Callbook, and then selecting your callbook type and its path settings. If there is an entry in the current QSO line in the log, that entry will be entered in the Call: text box when the Callbook dialog is opened. If you want a different call, type it into the Call: text box. Click the Search... button to look the call up in the callbook.

Status Bar
When checked, the Status Bar will be displayed. **Note:** Right clicking in the status bar will bring up additional display options.

Statistics
Give you display options for your contest statistics while in the MixW contest mode.

Quick search
The Quick Search dialog is for searching for incomplete callsigns. Select View | Quick search | Show dialog. Next select your preferred method of searching from the options by selecting View | Quick search | <preferred method>. Now with the Quick search dialog selected you can enter part of a call sign into the new QSO cell of the Log Bar. Wildcards ('*' and '?') are allowed. Red ticks will indicate if you have already had a QSO (indicating a dupe) with this station (this will be according to the current contest settings).

NCDXF/IARU Beacons
This dialog allows you to automatically QSY your rig to the various beacons. The options reflect the active beacons based on Zulu time. Clicking on one of the active beacons will QSY your rig to that beacon's frequency, and set the mode to CW for decoding it.
Note: Your computer time must be set extremely accurately to use this feature, otherwise the list will not be in sync with the beacon timing. You must also have the CAT feature properly configured to automatically QSY the rig.

Scanner
Allows you to configure frequencies or ranges of frequencies to be scanned. The scans are initiated and terminated with macros.

Contest mode
The contest mode dialog is used for selecting, editing or adding contest settings.

Spectrum
Here you can change between the Waterfall or Spectrum displays as well change the colors, zoom, and RF markers. Many of these items can also be changed by Right Clicking in the waterfall or spectrum display windows.
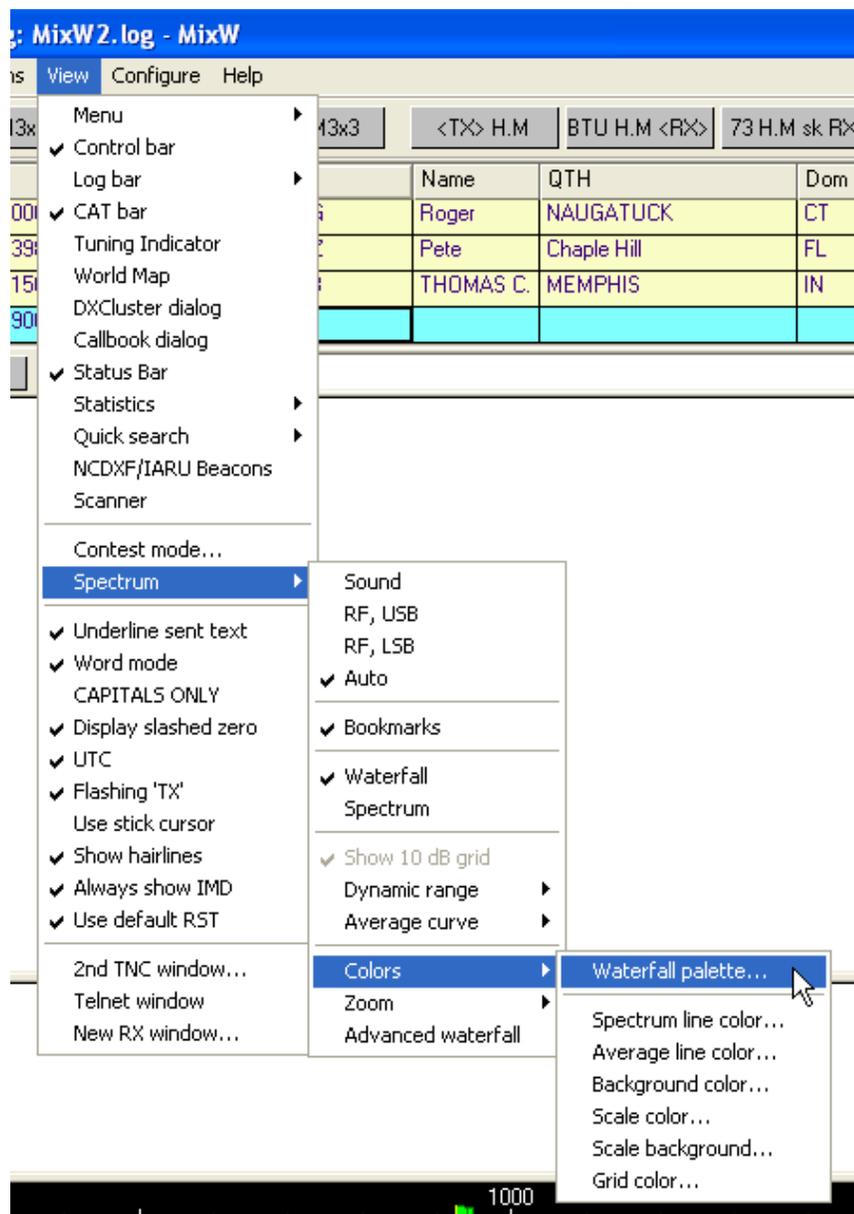
Note: you can also change the speed of this display in the sound card settings dialog box. Select Configure | Sound Card settings. The faster speeds require faster computers.

Displaying spectrum frequencies and Configuring for LSB or USB operations: The MixW options for RF, USB/LSB should be configured to reflect your mode of operation by selecting View | Spectrum | RF, USB or RF, LSB or Auto, or Sound. These must be set correctly in order for the frequencies in the displays to represent your actual operating frequencies, and for MixW to automatically adjust the inversion settings based on your RF mode. See the information on inversion in Configuration.

Advanced Waterfall
When checked the entire waterfall will move as you tune the transceiver (CAT must be enabled). This prevents the "smearing" of the signals already in the waterfall. Requires a fast computer for smooth operation.

Underline sent text
When checked, the text in the TX window will be underlined as it is transmitted. Transmitted text will also be echoed to the RX screen in a user-assigned color as configured under Configure | TX font color. The Underline sent text should be enabled if you want to edit the text that still remains in the TX buffer.

Word mode
Selecting word mode prevents text from going to the transmit buffer until an entire word is typed in the TX window. This can be handy as it allows for editing a word in modes that do not support the backspace key, such as RTTY and AMTOR.

Word mode is only available when using the Underline sent text option as described above. Also, when using word mode, several Macros will require a space to be present after the Macro command itself in order for it to be sent to the TX buffer properly.

CAPITALS ONLY
Selecting CAPITALS ONLY will automatically convert any lower case characters entered in the TX window to upper case when sent to the TX buffer. This is handy for the RTTY and AMTOR modes, which only support upper case characters.

Display Slashed Zero
Provides the user a choice of styles for the numeric zero.

UTC
Causes the time displayed on the right end of the status bar will be in Universal Coordinated Time. When unchecked, will be in local time. If the clock of the host computer is set to UTC instead of local time, the Time Zone setting under Windows needs to be set to GMT and adjustment for "daylight savings changes" disabled.

Flashing 'TX'
The 'TX' indicator for transmit on the status bar will blink on and off. When unchecked, the 'TX' indicator will not blink.

Use Stick Cursor
Will turn the mouse pointer to a thin stick while in the waterfall display. This can facilitate placing the tuning diamond in the middle of a signal.

Show hairlines
Selecting Show Hairlines causes hairline tails to extend down from the tuning indicators (from the top to the bottom of the waterfall display). These can be an aid to tuning certain signals.

Always show IMD
Will display the IMD reading constantly when receiving a PSK31signal instead of just during the idle tones. However, the idle tones are the best time to determine the station's IMD.

Use Default RST
Will send the default RST when the RST Macro is used, instead of asking for your RST report.
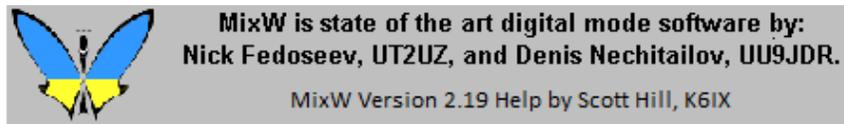
2nd TNC window
Selecting this option displays a 2nd TNC window.

Telnet Window
Opens a window allowing the user to initiate a Telnet session over the internet. This could be a Telnet DX Cluster, or any other standard Telnet communication. An internet connection must already be open.

New RX window
Opens an additional RX window tuned to the frequency currently selected in the waterfall display.

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Using the Status Bar
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The Status Bar is located at the bottom of the MixW screen. The information that appears on the Status Bar in part depends on the mode selected. For instance, IMD is relevant in the PSK31 mode, while Connected or Disconnected are relevant for Packet:

TX/RX: The leftmost box indicates either TX or RX depending on the current status of MixW, and transmit and receive can be toggled by clicking on this indicator box.

Squelch (Sq) can be also be toggled on or off by clicking on the Sq box, and the threshold can be set by right clicking on the Status Bar and selecting "Squelch Threshold" from the Pop Up menu:
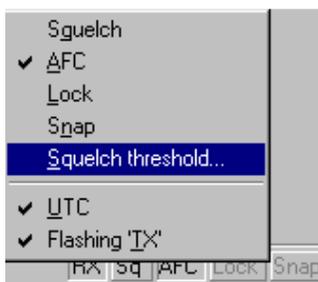
Clicking on Squelch Threshold pops up the following box:

In addition to setting the Squelch threshold, AFC and Snap can also be set from this pop up dialog.

 If MixW appears to stop decoding, be sure the squelch threshold is not set too high. For reception of weak signals, it is usually best to turn the squelch completely off. This will result in "garbage" print some of the time, but whenever the signal becomes strong enough, the text will appear on the screen along with the garbage characters.

AFC, Lock, and Snap can also be toggled for the modes in which they are available by clicking on their boxes in the Status Bar.

Frequency: The current audio operating frequency is indicated in Hz. This represents the offset from your transceivers frequency.

IMD: Clicking on the IMD box will freeze the IMD at the last observed value. Clicking on it again will activate the IMD reading again.
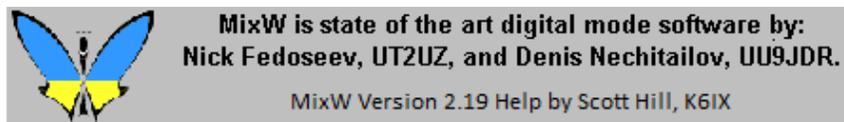
IMD is a measure, in dB, of the level of the first pair of unwanted sidebands (at +/-46Hz from the center-frequency) compared to the main pair of wanted sidebands (at +/-15Hz). The readout is accurate only when the signal is idling, and at that time, the emission is actually the same two-tone signal that is used for checking the quality of SSB transmitters, and the IMD dB figure is the same as the third-order intermodulation performance figure given for SSB transmitters.

IMD readings are only accurate, and only display when the station is idling, and there is not another station very close in frequency, and when the S/N ratio of the received station is about 20 dB or greater. Typical IMD readings are -25 dB to -30 dB for a well-adjusted transceiver, and readings of -20 dB or worse indicate that the transceiver's extra sidebands can cause QRM to adjacent stations.

Mode: The current operating mode is indicated in the box next to the IMD reading.

Date: The current date is displayed.

Time: The current time is displayed. By right clicking the status bar, you can select to display UTC or Local time.

MixW is state of the art digital mode software by:
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MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Logging and QSLing
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MixW's Logging features make it easy to keep track of all your QSOs. The contest mode will track your contest progress, complete with multipliers, while automatically checking for DUPs and auto-incrementing serial numbers for exchanges. The normal mode can track your regular ragchewing and award hunting contacts. You can design 4 different log bar layouts and select the one you want for a particular purpose from View | Log Bar | Normal/Contest/Custom 1/Custom 2.

The Log Button Bar which appears at the bottom of the Log Bar controls several log functions. Search allows you to search the log for a callsign. Details will bring up the full log information for the selected QSO. Delete will delete the selected QSO, and Save will save the New QSO line to the Log.
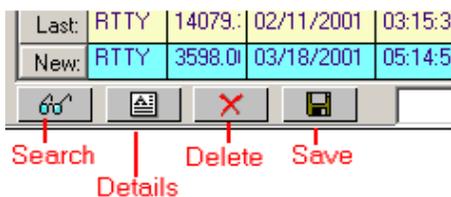
Note: To scroll all the entries in your log click Search (eyeglasses) and then click the Whole Log button. To see all the fields in the log click Details ('A'). Since there are too many fields in each log entry to put in a single line across the page you must choose the set of fields you want to display, and the width you want each field.

Up to 25 lines may be shown in the log bar. Double click in a blank area of the log bar to undock it. Resize the log bar for the number of rows you want. Double click the log bar again to redock it.

QSO	Mode	Freq	Date	UTC	Call	Name	QTH	Dom	RST_S	RST_R	Notes
322	HELL	14079.600	10/08/04	23:48:48	KG4WNA	John?			599	599	could not copy
323	CW	14058.651	10/09/04	00:04:32	W4POS	WILLIAM D	JACKSONVILLE	FL	599	599	little too fast but I got it
324	MFSK	14072.036	10/14/04	00:07:18	WA9HCZ	JEROME C	ONALASKA	WI	599	599	too much qsb
325	CW	14100.000	10/21/04	01:28:17					599	599	

The Normal and Contest Layouts show a pre-chosen set of fields, while the Custom 1 and Custom 2 Layouts have all fields available. The widths and heights of the Log columns are configurable. Place your cursor between two columns or rows in the gray (title area), then click and drag to the desired width or height. To see additional fields in the Custom Layouts you must hide some of the fields on the left side of the layout so that fields can move in on the right side of the layout. To hide a field drag the right side completely over the left side, decreasing the size to zero.

For the more computer adept the following method can be used:

Files Custom1.dat and Custom2.dat contain a list of log fields for the corresponding log layout. Each of these files looks something like this:

1 MODE
2 FQRX
3 FQTX
4 DATE
5 TIME
6 CALL
7 RSTSNT
;8 EXCHSNT
9 RSTRCV
;10 EXCHRCV
14 DOM
11 NAME
12 QTH
;15 COUNTY
16 IOTA
17 MGR
13 NOTES
;18 ENDDATE
;19 ENDTIME
20 LOC

Lines which begin with ";" are ignored, so fields EXCHSNT, EXCHRCV, COUNTY, ENDDATE, and ENDTIME are absent in this example. You may change the order of lines (and according columns) but do not change the numbering, i.e. CALL should always have 6 at the beginning.

Making entries in the log.
Entries may be typed directly into the log, by left clicking on the field, or they may be moved into the log from the RX window. Double clicking on a word in the RX window will copy it into the call, name, or RST Rec. field in the log depending on the configuration of the word.

For Roundtable operation, a second, third, etc. call may be appended to the Call window by copy and paste from the RX window, and separating the calls with commas. If this is done, all buttons using the <CALL> macro will also use the additional calls.

Holding the CTRL key and double-clicking on a word will **append** that word to the QTH box. By holding down CTRL and double-clicking each word of a QTH in turn, a multi-word QTH can be entered into the log without typing.

All log entries can also be filled in by highlighting the information on the screen, holding down the left mouse button, "dragging" the information into the desired box, and releasing the mouse button.

A log entry may also be filled in by highlighting the information, pressing the right mouse button, and copying and pasting the information into the desired box, or choosing a location from the displayed menu. This method can be used to capture a call with imbedded spaces such as "K E 6J"

When the desired entries are filled in, clicking the Save icon button will save the information into the log, You can also use the <SAVEQSO> macro at the end of your sign off macro to automatically save the QSO to your log. By clicking the Search icon button you can search the log for any character or string of characters by typing a string to be found and clicking the Search button on the search dialog. You can also display the entire contents of the log by clicking the "Display Whole Log" button.

Note: If you select a new callsign in the RX window before you have saved your QSO information, your "New" QSO line will be cleared and the new call inserted. To avoid the possibility of accidentally loosing a QSO this way, UNcheck "Clear QSO on new call" under the Options menu, then a new call will not clear the unsaved QSO. You can also restore an accidentally cleared or deleted QSO by selecting File | Restore removed QSO.

Printing and Exporting your log file.
First select the QSO's you want to print by clicking on the Search button in the Log Bar, which will bring up the "Search in Logfile" dialog:

You can now display the whole log by clicking the **Whole Log** button, or search for particular groups of entries by selecting the fields to be searched, along with the search criteria, and clicking the **Display** button. The following window will be opened to show the records that were found:

The fields in the Search Results window can be resized in the same way as the Log Bar so that you can see the fields you are interested in. Select the records you want using standard Windows functions such as Click, Shift-Click, and CTRL-Click. To select all the records in the log, for example, click on the last record, and then Shift-Click on the first record. Use the buttons at the bottom of the window to print or export the records you have selected. You can also Edit or Delete log entries, look up contacts in the Callbook, or display statistics from the selected entries.

Sending an eQSL card
You must be registered with eQSL (www.eqsl.cc) and have a valid password. The computer must be on-line, but you do NOT need to be signed in to eQSL. Select the log entry you want to QSL in the Log Bar and click the QSO Details button, or in the Search Results window click the Edit button. This will bring up the Edit QSO window. Make any changes or additions you want and click the Send eQSL! button. You will be asked for your password, and then a window will be displayed showing the status of your eQSL. Click the eQSL sent box before closing the Edit QSO window.

If you want to send a batch of selected qsl-records, you just "right click" the mouse in the highlighted (selected) area of the MixW log file "Search results" window. A new menu now appears, where you choose "Send QSL(s) to eQSL.cc". The whole batch of qsl's is then transmitted to the eQSL database.

You can also send eQSL's by exporting selected records to an ADIF file and uploading that file to eQSL.

Using the MixW program to create a QSL card to print or to email.
The MixW program provides a dynamic data exchange (DDE) link for use by other Windows programs such as MS Word and Excel. The data that is available can be used to create a QSL card by inserting DDE fields into a document that will be viewed as a QSL card in the final form. To learn more about DDE fields, go to the HELP files in your application that supports Windows DDE fields. The chart below shows the DDE code fields that are supported by MixW:

Entity	Server Name	Topic	Item	Current state
Your call	MixW	Info	MyCall	K4SET
Your name	MixW	Info	MyName	Scott
Your QTH	MixW	Info	MyQth	Murray, KY
Program name	MixW	Info	Program	MixW
MixW version	MixW	Info	Version	2.0 beta 21
QSO date	MixW	QSO	Date	28-Jan-2001
QSO time	MixW	QSO	Time	20:57
Frequency, MHz	MixW	QSO	Mhz	14.1
Mode	MixW	QSO	Mode	BPSK31
Call	MixW	QSO	Call	W8HAT
Name	MixW	QSO	Name	RICHARD
QTH	MixW	QSO	Qth	STEVENSVILLE MI
RST sent	MixW	QSO	RstSnt	589
RST received	MixW	QSO	RstRcv	589
Notes	MixW	QSO	Notes	Likes to fish
QSO is unsaved	MixW	QSO	Changed	NO
QSO freq.	MixW	QSO	Khz	14070
Zero beat freq, kHz	MixW	CAT	Khz	14070.000
PTT state	MixW	CAT	PTT	OFF

To use these field codes in a QSL or for making mailing labels, you enter the field code in the document where you want it to appear. In MS Word 2000 you can add a DDE field by using Ctrl-F9, then fill in the field code. To view the results in the final form, use Alt-F9.

From the chart above, you would create "your call" with the following string of field code:
 {DDEAuto "MixW" "Info" "MyCall" \ *MERGEFORMAT}

The following describes how to create a QSL card with MixW V2.X using the MS Word 2000 form provided with the program:

Step 1. Open the log entry that you wish to use for the QSL card. Either select the log entry from the MixW log window or use the Search feature to find it and then open it in the Edit QSO window.

Step 2. Make sure all the desired log entry fields for the QSL are entered into the log. Leave the log entry open while completing the remaining steps.

Step 3. Find the "MixW QSL card test.doc" file in the MixW folder and open it in the MS Word program.

Step 4. Use the MS Word print function and your color printer to create a hard copy of the QSL card.

The following will describe how to create a graphical file of the QSL to attach to an email:

Step 1. Repeat steps 1, 2 and 3 above for creating the QSL card in MS Word.

Step 2. Select (highlight) the entire QSL card by Edit | Select All, from the tool bar.

Step 3. Copy the QSL card by Edit | Copy, from the tool bar.

Step 4. Open your favorite graphics editor (like Paint Shop Pro) and then Paste the QSL card into the editor by Edit | Paste as New Image. (Note, Paint shop Pro 4.0 is still available as shareware from the Internet.)

Step 5. Save the QSL card as a .gif file by File | Save as | CompuServe GIF file. Save it to a directory where you can retrieve it later as an attachment file to your out-going email.

MixW: Digital Modes
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CW	**FAX**	**RTTY**
Amtor	**Packet**	**Pactor**
PSK	**MFSK**	**THROB**
FSK	**MT63**	**SSTV**
Hellschreiber	**Olivia**	

MixW: CW
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CW Introduction and Theory

CW Operation

MixW: CW Intro and Theory
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With thanks to Steven R. Hurst, KA7NOC

CW and Morse Code.
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.

Beginning 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 partically 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.

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX
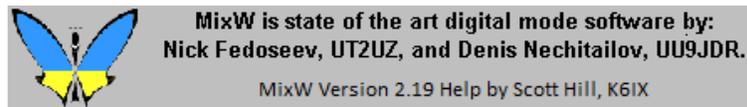
MixW: CW Operation
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Configuration
There are five different methods for operating CW with MixW.

- 1. Sending and receiving with the soundcard (while the transceiver is in SSB mode)
- 2. Manual sending and receiving (while the transceiver is in the CW mode).
- 3. Keying your transceiver with a key plugged into the computer, which is similar to the way MixW handles the PTT signal for the other modes (your transceiver is in the CW mode)
- 4. Via a CAT command to your transceiver (your transceiver is in the CW mode).
- 5. Via a dedicated hardware multimode TNC in the CW mode (for both decoding and encoding of CW via the TNC).

SoundCard approach: The soundcard approach to CW operation is the simplest to implement. In this approach, your transceiver is in SSB mode (either USB or LSB will work). Configuring MixW to use the SoundCard approach is the same as with the other digital modes. First select Configure | TRCVR CAT/PTT... and check "CW out via soundcard". Next, select Mode | CW, and then select Mode | Mode Settings... and choose an RX Algorithm. Then you can select your RX and TX frequency by clicking in the waterfall, and transmit by typing into the TX pane and clicking the RX button in the Status Bar. Your rig is switched to TX with VOX, PTT, or CAT, just as it is for any other mode.

Manual Sending and Receiving: In the manual mode you only use MixW as a tuning and logging program. Select Configure | TRCVR CAT/PTT... and UNCHECK "CW out via soundcard". Then choose Mode | Mode Settings, and select Manual from the RX Algorithm selections. Plug your key into your transceiver, and set the transceiver to CW mode. Now the frequency of the CW tranmission 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. With the RX Algorithm set to manual you can type into the RX pane and use MixW's logging features. 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: In 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. You then have full advantages of your transceiver's CW filters etc. For this method you need to make up an interface that will connect either RTS or DTR (this can be shared with your PTT circuit, in which case it would use which ever pin is not in use by PTT) of your computer COM port to the keyer input of your transceiver.

CAT operation: If you are already triggering PTT via the CAT control options of MixW, this may be your best option for

keying CW as well. To implement direct CAT operation for CW select Configure | TRCVR CAT/PTT. Check the box to use the "CW via CAT command" option, and make sure your Com port and rig settings are correct. You can also adjust for correction in your frequency reading for the CW mode by using the "Cat correction in Hz" box for CW. For more information on these settings see the Configuration topic. Now when you set MixW for the CW mode, it will automatically switch your rig to the CW mode and trigger CW keying through CAT as well as adjust your frequency standard according to these settings.

CW via a Hardware TNC:
See TNC Configuration and operation topic to use MixW with a hardware TNC for CW operations.

Operating CW (using the soundcard)

First, switch to the CW mode by selecting Mode | CW, or by clicking on the mode box in the Status Bar and selecting CW. Next set your CW settings by selecting Mode | Mode settings. This will bring up the following CW settings dialog box:
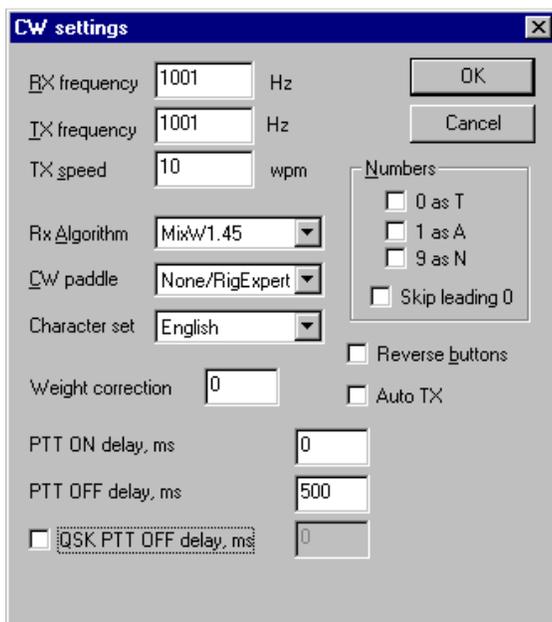
Here the TX and RX frequencies are displayed and can be changed, although it is much easier to change them by clicking in the spectrum/waterfall window.

You can also tell MixW to convert your 0, 1, and 9s to letters as indicated by checking these boxes. You can set the sending speed, although this is more easily adjusted by clicking in the speed display which automatically loads with the CW mode:
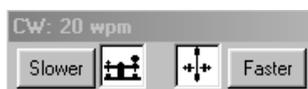
Note: The speed adjustment is for sending speed only. MixW automatically detects the RX speed and adjusts accordingly, but it will send at whatever speed is indicated on the CW speed box.

Receive: To receive CW tune to one of the CW sub-bands and listen for CW signals while watching the spectrum/waterfall display. Click on one of the signals as indicated here in the waterfall display, and you should start seeing text appear in the RX window:

You will notice in this picture that while the letters are being decoded accurately, the timing of the characters being sent is such there are spaces between each one. It is important to note that accurate CW decoding, whether by hardware or software TNCs, is difficult to achieve due to the lack of timing standards with CW operations. Computer generated CW is the easiest to decode accurately in software, but even this is a challenge (as you can see above) because timing parameters vary between the different software packages and user settings. You will notice quite a few missed characters while trying to decode some hand sent CW, especially from a straight key.

Transmit: To switch between Transmit and Receive click on the TX/RX box in the status bar. For additional information on general operating procedures see the General Operation topic.

As with most of the other digital modes, It is possible to open multiple RX windows and switch the active window (the one you will be sending to) between them. For this and other general operation techniques see the General Operation topic.

Other hardware options.
MixW is capable of using a Joy Stick port or a Parallel port for CW key or keyer input. The following diagram shows how to wire these ports:
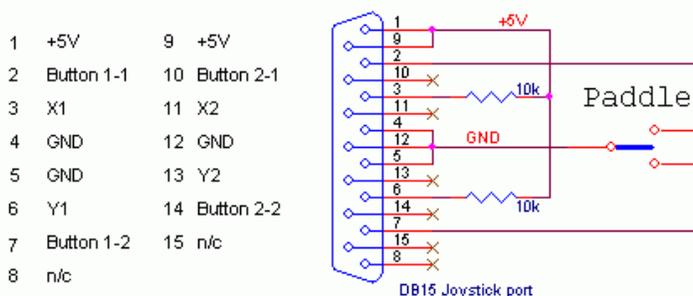
* Resistors (1..10k) are only needed to let Windows detect the "CW joystick"
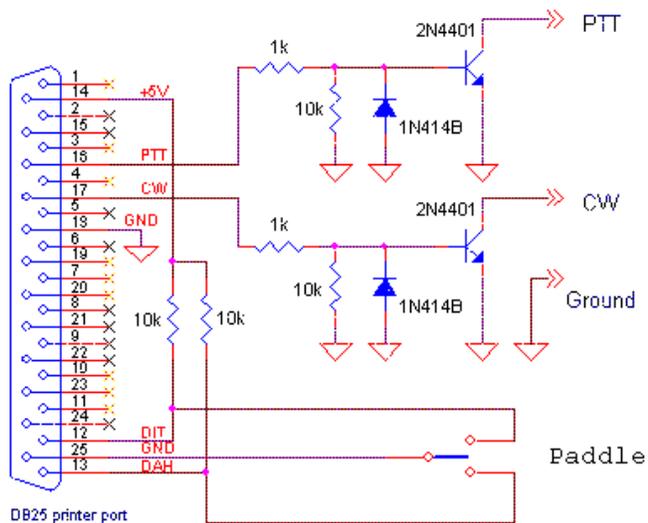
MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

MixW: FAX

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FAX Receiving

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

MixW: FAX Receiving

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For information on HF FAX stations and some theory of operation visit:

http://www.hffax.de/HF_Fax/HF-Fax_Schedules/hffax_schedules.html

MixW supports FAX receive only. The following procedures will help you get started receiving FAXes.

Your transceiver should be set to USB and tuned to one of the frequencies of the FAX stations listed at the website shown above. Be sure to calibrate your sound card as discussed in the SSTV Operations topic.

Calibrate your sound card (see SSTV Operation for calibration instructions).

Toggle all the toolbars off by selecting View and then uncheck the various toolbars to get a larger viewing window for your incoming FAXes.

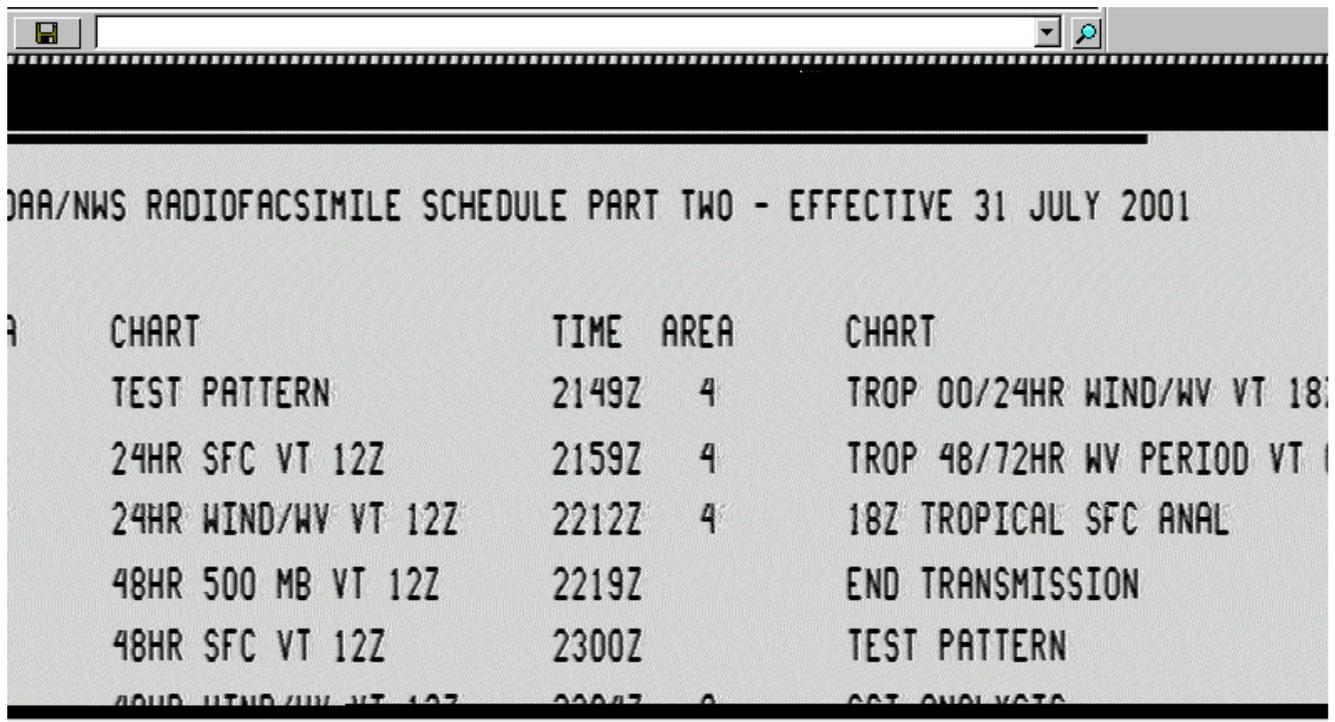Select Mode | FAX,, then select Mode | Mode settings to bring up the settings dialog box:
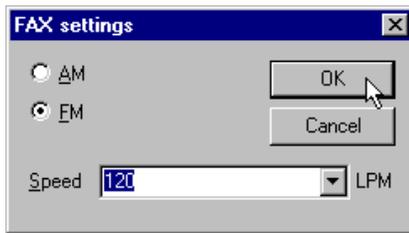
Most Weather fax is 120 LPM in FM mode.

To print a received FAX use a screen capture program or press the Print Screen button on the computer keyboard to save the screen to the Windows clipboard. Then you can paste the picture into Microsoft Paint or a graphics program.

The following picture shows the display of a properly tuned WX FAX station:
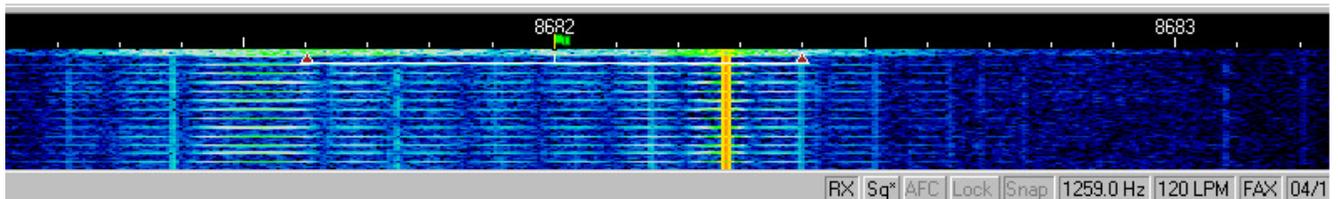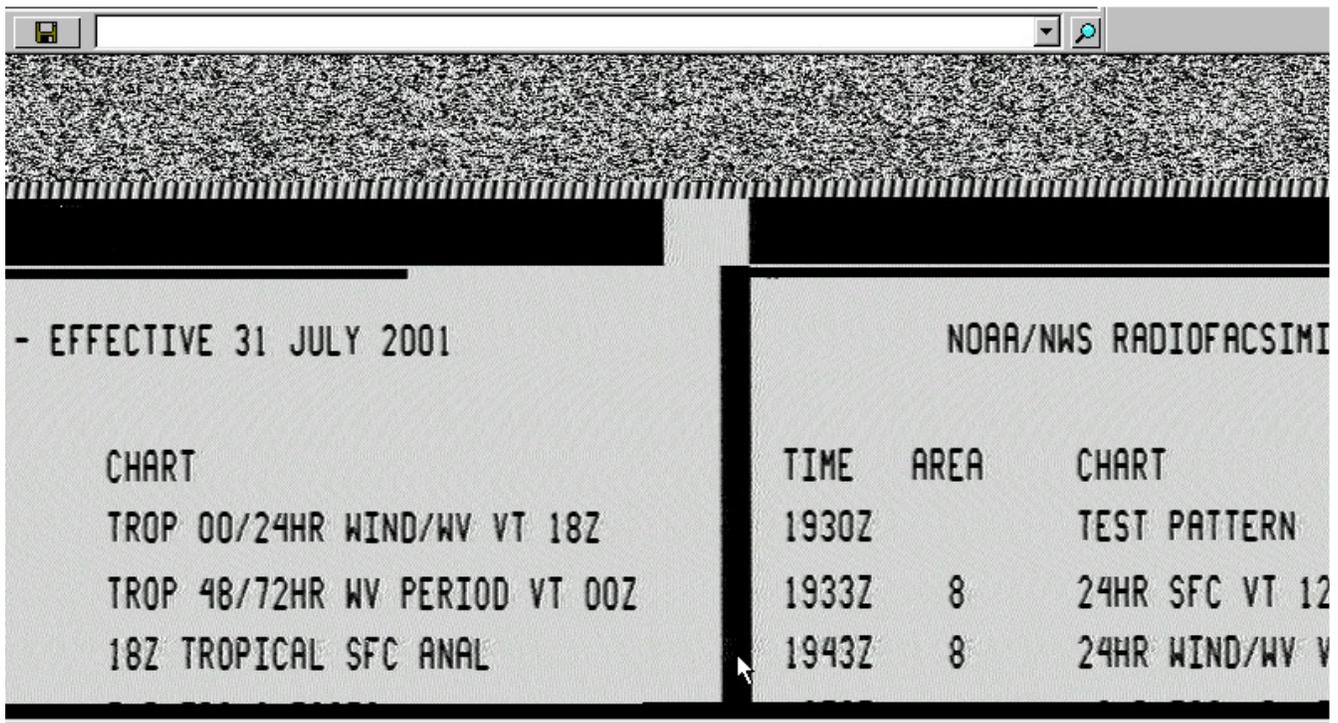
Notice that the picture being received is not alligned properly--it is split in the center. To correct a misaligned picture click on the vertical line in the picture that you want to be the new left hand edge (note the position of the mouse pointer in the illustration above). MixW will then realign the picture as shown here:
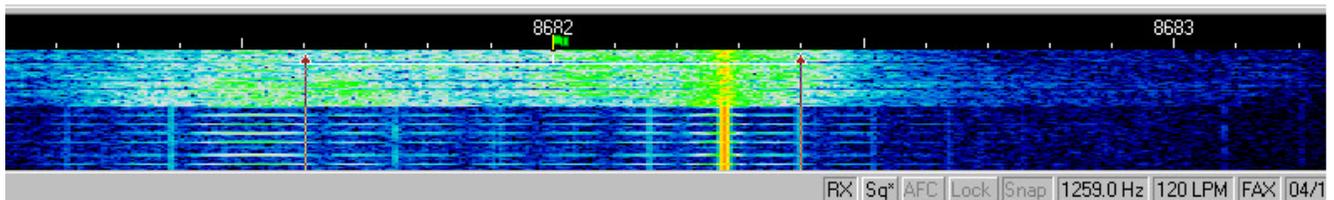
MixW: RTTY

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RTTY Introduction and Theory

RTTY Operation

MixW: RTTY Intro and Theory

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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).

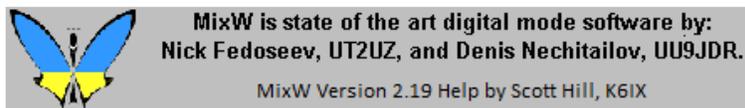Then everything goes back to normal, using the original alphabetic table of codes.

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.


MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

MixW: RTTY Operation
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Transceiver Settings

Fine Tuning: If your transceiver is equipped with a "FINE" tuning feature, always use that for RTTY tuning once you have found RTTY activity. Most of your adjustments can be made in software, and not with the transceiver's VFO if you prefer. In the PSK31 modes almost all tuning is done in software. For RTTY, I prefer to tune with the VFO. Some older rigs are really not stable enough for PSK31 operation and will drift considerably off frequency, but because of the wider bandwidth, they are fine for RTTY.

USB: Historically ham radio RTTY operators use LSB transmissions and a 170Hz shift between the MARK and SPACE signals, with the MARK signal being the higher in frequency. With MixW the convention is to use USB for all modes, since the program will adjust the inversion automatically. **Note:** MixW automatically adjusts the Mark and Space tones depending on which sideband you are operating on. If you are not using CAT, MixW needs to know which sideband your operating on to set the Mark and Space correctly. (See inversion in the Configuration topic).

Filtering: Optimum filtering depends on your transceiver's SSB filtering options and IF rejection characteristics. Wide filtering will enable you to work the largest spectrum without retuning your transceiver, but can also cause problems when there are strong adjacent signals. A narrow (RTTY or FSK) filter may help significantly with some radios and situations. Many transceivers, however, do not have narrow filtering options while operating in SSB modes. Consult your manual and experiment for the optimum configuration for your setup and conditions. The following waterfall display shows MixW's panoramic display when using a wide filer setting on the transceiver:
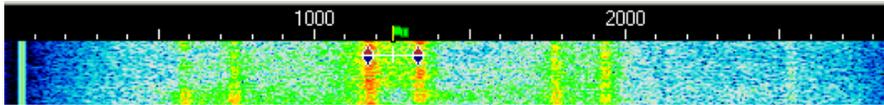
Here there are 3 different RTTY QSOs we could copy with the simple click of the mouse in roughly 3 KHz of spectrum. The strong one in the middle is currently selected and will provide the best print. The others may be too weak to copy 100 percent.

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.

MixW Settings

Mode: Click on the mode box in the status bar and select RTTY. Next bring up the "Mode Settings" by clicking on the mode box in the status bar and selecting "Mode Settings". This brings up the following dialog box:
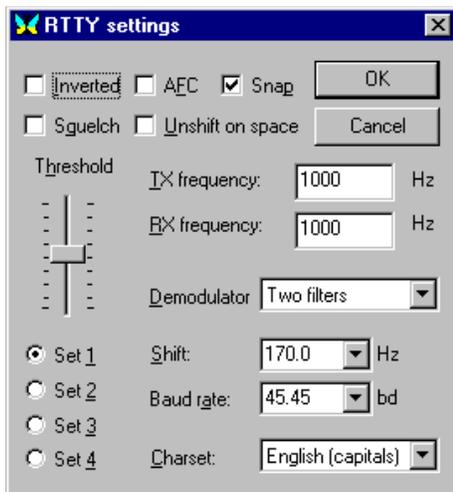
The TX and RX frequencies are set to the location of your cursor in the spectrum window. Keeping this around 1000 - 1500 Hz, will keep your transceiver operating close to the center of its pass band.

Shift is selectable (if you don't see what you want in the drop down box, any number can be typed in). Most RTTY uses a shift of 170 Hz, however setting this to 182 Hz often improves the copy for some signals.

Baud rate is also configurable. Most of the time this will be 45.45 Baud, but the other options are nice to have as well. You will sometimes find stations operating different shifts and baud rates.

The Character set can also be configured for the language you will be using.

The Mark and Space tones can be inverted by checking the "Inverted" box.

Up to four different sets of parameters can be configured for RTTY operation by selecting the different "Set" radio buttons (set 1 - 4). It is then possible to designate different operating parameters for each set, such as shift, baud rate, character set etc., which will then be remember for that set. These can then be easily recalled by selecting the different radio buttons.

AFC can be **on** to assist in tuning and tracking the RTTY signals. RTTY tuning is not as critical as the narrower modes, so AFC is more of an option than a necessity.

Lock should be **off** so you will be transmitting on the same frequency you're receiving. The exception here would be if you're working a station that is drifting and want that station to find your more stable frequency each time. Lock can also be used for working split.

Inverted when clicked will invert the positions of the MARK and SPACE frequencies. If you appear to be tuned into a strong signal and are only copying garbage, try clicking Mode | Inverted, or clicking the box in the RTTY settings**.** You will often find the station start to print 100 percent as a result. **Note:** This feature works differently in MixW than most other

SoundCard digital programs, so please read and understand the information about inversion in the Configuration Section.

Squelch and Threshold can be used and adjusted to suite your operating preferences.

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. The RTTY tuning indicator is two diamonds, linked together with a bar and separated by the shift width you have selected in options dialog. The diamonds will move together to track and tune RTTY QSOs.
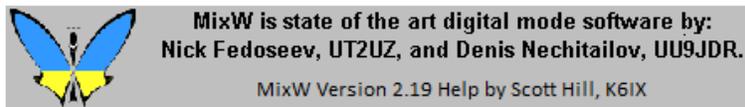
When working RTTY, especially during contest operation, I prefer to leave the tuning indicators in a position at roughly 1500 Hz (or centered in my Spectrum window) and then use the transceiver VFO set on "Fine" to tune in the RTTY signals. I find that I can tune more quickly this way, and also keep the QSO centered more effectively in my transceiver's pass band. RTTY is much easier to tune than most of the other digital modes.

Transmitting RTTY
To transmit to a station, first tune it in as indicated above. Type your outgoing text in the Transmit Window. Press the TX/RX button 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 TX/RX button again. Pressing ESC will abort transmission and return MixW to receive mode, but the last several characters typed will not be transmitted.

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: - ( ) $! " / : ? .
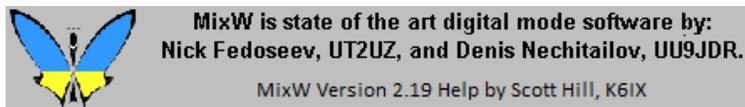
When transmitting, the waterfall will freeze and remain frozen until returning to Receive.

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Amtor
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Amtor Introduction and Theory

Amtor Operation

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Amtor Intro and Theory
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**With thanks to Tony Lonsdale, VK2DHU
and Norm Sternberg, W2JUP**

AMTOR is a specialized form of RTTY. The term is an acronym for AMateur Teleprinting Over Radio and is derived from the commercial SITOR system (Simplex Telex Over radio) developed primarily for Maritime use in the 1970s.

In the late 1970's, Peter Martinez, G3PLX, made several changes to the SITOR protocol, which rendered it suitable for amateur radio use, and called it AMTOR.

AMTOR improves on RTTY by incorporating a simple Error Detection technique. The system remains relatively

uncomplicated but AMTOR performs well even in poor HF conditions. While there can still be some errors in AMTOR data, the Error Detection gives excellent results for normal text mode conversations because of the high redundancy in plain language text.

There are two modes used in Amtor: ARQ and FEC. **MixW supports the FEC mode only.**

ARQ: The ARC mode is a Synchronous protocol, which means both stations are synchronized to each other's signals.

In ARQ mode (Automatic Repeat Query), sometimes called Mode A, data is sent in groups of 3 characters. Although each character is only 5 bits (same as for RTTY), two additional control bits are added, so each character has a total of 7 bits. There are always 4 marks and three spaces in every transmitted character. If the receiving station gets some other combination it knows an error has occurred. The 40 percent overhead is considered worthwhile for error detection. This technique can identify most errors. The standard calls for no more than three errors in 100,000 characters.

The receiver responds to each 3-character group by sending either an ACK (ACKnowledge) code (if OK) or a NAK (Negative AcKnowledge). Each time the transmitting station gets a NAK, that 3-character group is sent again. If you listen around on the HF bands in the recognized Data Segments of the bands, you might hear a chirp-chirp sound that identifies an ARQ transmission. Even when there is no data actually being transmitted, the transmitting station continues to send idle "chirps" to maintain the link.
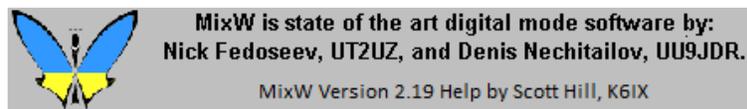
AMTOR supports a Listen Mode also and that allows you to monitor another ARQ session even though you are not participating in the session with the usual acknowledgements. Of course you are not able to participate in the error correction or synchronization.

One notable advantage of AMTOR is that when a link is failing AMTOR will try to reestablish synchronization between the sending and receiving stations rather than simply terminate the link.

FEC: In FEC mode (Forward Error Correcting), sometimes called Mode B, the sending station sends each character twice so this mode provides a means of transmitting to several stations at once. The receiving station does not acknowledge the data received. If a receiving station matches both instances of a character, that character will be printed, otherwise some error symbol is printed. This mode does not provide for the receiving station to ask for the missing data to be retransmitted. An FEC transmission sounds more like a Baudot RTTY signal.

The two stations need to keep in phase with each other so each FEC transmission is started with several sets of "phasing pairs" and these are sent at regular intervals even while there is no data being transmitted.

FEC Mode is still better than ordinary RTTY but its error detection is not as reliable as that in the ARQ Mode.

MixW is state of the art digital mode software by: Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Amtor Operation
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MixW supports FEC mode only for AMTOR, therefore AMTOR settings and operation are much like those for RTTY.

Transceiver Settings

Fine Tuning: If your transceiver is equipped with a "FINE" tuning feature, always use that for AMTOR tuning once you have found AMTOR activity. Most of your adjustments can be made in software, rather than the transceiver's VFO if you prefer. Some older rigs are not stable enough for the narrow modes, but because of the wider bandwidth, they can be used for AMTOR.

USB: In the past AMTOR operators used LSB transmissions and a 170Hz shift between the MARK and SPACE signals, with the MARK signal being the higher in frequency. With MixW the convention is to use USB for all modes, since MixW will automatically invert your signal if you have told it you are in USB. See inversion in the Configuration Section for more information.

Filtering: Optimum filtering depends on your transceiver's SSB filtering options and it's IF rejection characteristics. Wide filtering will enable you to work the largest spectrum without retuning your transceiver, but can also cause problems when there are strong adjacent signals. A narrow (RTTY or FSK) filter may help significantly with some radios and situations. Many transceivers, however, do not have narrow filtering options while operating in SSB modes. Consult your manual and experiment for the optimum configuration for your setup and conditions.

MixW Settings Mode: Click on the mode box in the status bar and select AMTOR. Then click on the mode box in the status bar again and select "Mode Settings". This brings up the following dialog box:
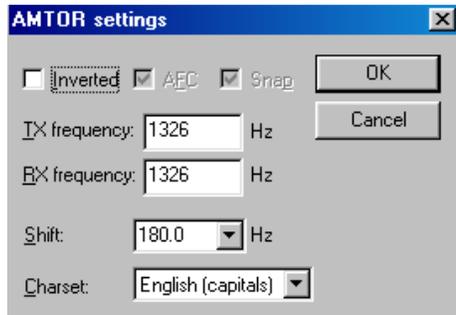
The TX and RX frequencies show the position of your cursor is in the spectrum window. Keeping this around 1500 Hz, will keep your transceiver operating close to the center of its pass band. Shift is selectable (if you don't see what you want in the drop down box, any number can be typed in). Most AMTOR uses a shift of 170 Hz. You can invert the Mark and Space signals by checking the "Inverted" box.

AFC should be on to assist in tracking the AMTOR signals but since AMTOR tuning is not as critical as some other modes, AFC is more an option than a necessity.

Lock should be **off** so you will be transmitting on the same frequency you're receiving. The exception here would be if you're working a station that is drifting and want that station to find your more stable frequency each time, or if you are working a net.

Inverted when clicked will invert the positions of the MARK and SPACE frequencies. If you appear to be tuned into a strong signal and are only copying garbage, try clicking Mode | Inverted, or clicking the box in the AMTOR settings. You will often see the station start to print 100 percent as a result. **Note:** This feature works differently in MixW than most other SoundCard digital programs, so please read and understand the information about inversion in the Configuration Section.

Receiving AMTOR
AMTOR signals display as two parallel lines usually 170HZ apart . Tune in a AMTOR 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. The AMTOR tuning indicator is two diamonds, which are linked together with a bar and separated by the shift width you have selected in options dialog. The diamonds will move together to track and tune AMTOR QSOs. The following screen shot shows an AMTOR QSO in progress:
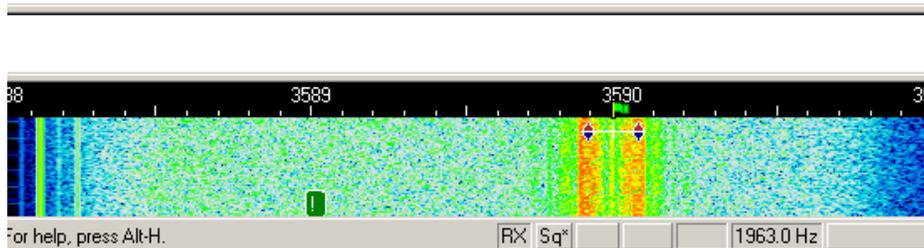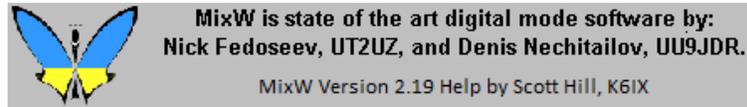

Transmitting AMTOR
To transmit to a station, first tune it in as indicated above. Type outgoing text in the Transmit Window. Press the T/R button

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 (or one of the other toggles) again. Pressing ESC will abort transmission and return MixW to receive mode, but the last several characters typed will not be transmitted.

Note: AMTOR, like 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 in AMTOR: - ( ) $! " / : ? .

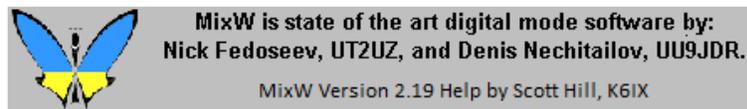MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.
MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Packet
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Packet Introduction and Theory

VHF Packet Operation

HF Packet Operation

TCP/IP Over AX.25

PBBS Commands

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.
MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Packet Intro and Theory
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Adapted from TAPR Publication #95-1, 1995

History of VHF/UHF Packet
Packet radio has been around since the mid-1960's, but was first seen on the amateur VHF bands in 1978 through research done in Montreal, Canada in 1978, the first transmission occurring on May 31st. This was followed by the Vancouver Amateur Digital Communication Group (VADCG) development of a Terminal Node Controller (TNC), also known as the VADCG board, in 1980. This was then followed by TAPR, Tucson Amateur Packet Radio, with the creation of the TNC-1 in 1982 and then the TNC-2 in '84-'85. The packet radio revolution ignited when TAPR sold over a thousand TNC-2 kits. The TNC-2 was what was needed to make this mode take off. There could be another packet radio revolution fueled by MixW and the other new software that utilizes the soundcard based TNC approach.

What can I do?
Like any mode in the amateur service, packet provides a group of amateurs with a way of having fun and meeting one of our primary aims, "improving the radio art". But what can you do?

PBBS systems: Most cities have one or more packet Bulletin Board System, or PBBS for short. Many of these are operating on 145.01 MHz in the US. PBBSs do two main things: send and receive personal messages for their local users (like yourself) and send and receive messages or bulletins intended for people locally or around the world. Since the PBBS is part of a national system of other PBBSs, it has the ability to pass information or messages to any other PBBS in the US or the world. The second thing that BBSs do is pass local and national bulletins, which are messages intended to be read by everyone. In this way, amateurs can read the latest messages about the ARRL, AMSAT, TAPR, propagation, DX, and other

bulletins on varied topics. Message passing is the primary purpose of a PBBS system, but PBBSs can also support callbook programs, help references, Internet access, and more. For a list of typical PBBS commands see the PBBS Commands topic.

Keyboard-to-Keyboard: Like the other amateur modes in MixW, packet radio can be used to talk to other amateurs directly. With the use of networks, amateurs can talk at a distance beyond the reach of their own stations by using the network. Keyboard-to-keyboard communication is one of the least frequent uses of packet communications, because amateurs are rarely on packet at the same time. Many packet operators send electronic mail using either personal mailboxes or a local PBBS. In this way, messages are read when the amateur is on the air.

DX Packet Cluster: Many cities have DX spotting nodes or networks. HF operators connect to their local DX Packet Cluster in order to receive reports on the latest DX. This type of packet came about from those interested in 'chasing' DX. Many amateurs like to frequent the HF bands looking for rare international operators to contact. A DX Cluster allows many HF operators to be connected over packet radio at the same time while operating HF and hunting for DX. When someone finds a DX station, they send a packet message to the DX Cluster, which then sends the information to all other packet operators using the DX Cluster. In this way, you have several stations monitoring the band, looking for DX. Often an amateur will 'spot' (hear) a DX station and then distribute the DX report almost instantly. DX Clusters allow everyone to operate more hard to find DX stations in one evening than was possible operating alone.

RACES/ARES/NTS and Emergency Communications: Packet radio is being used in many emergency services. Whether packet is used to pass messages accurately and in large quantities or to handle messages passed by the National Traffic System, it can provide an important function. A new application called APRS combines GPS (Global Positioning Satellites) with packet radio to allow a master station to plot on their computer the location of all other stations in the field. The purpose is to coordinate the exact position of weather spotters or searchers, without having to waste radio time informing the control station of their locations. It is also possible to distribute Doppler Radar images via the packet network. The small weather image file takes but a few minutes to retrieve and display.
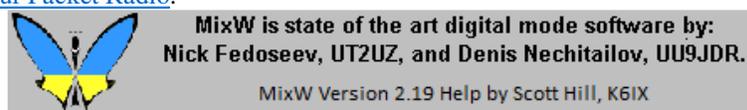
Networking: The main packet networking scheme uses Digipeaters. Digipeaters work much like a voice repeater. Digipeaters look at the packet, and if its call is in the digipeater field, resends the packet. Digipeaters allow the extension of range of a transmitter by retransmitting any packets addressed to the digipeater.

An average packet station talks in a radius of about 10-30 miles. Packet Networks allow amateurs to widen the area of communications past their line of sight, by having a series of packet stations linked by radio, which can be used to get their packet messages to wherever the network goes. Much like the telephone system, networks provide long distance service outside the local area.

Satellite Communications: Many of the amateur radio satellites in orbit contain computer systems that provide packet capability. Most packet satellites provide BBS-like functions for messages to be passed to anywhere in the world within 24 hours. Several contain CCD cameras, which allow amateurs to download images of the earth and some allow users to retrieve data from the onboard experiments. Most satellites use AX.25 protocol with special software developed for satellite communications.

For additional information on SoundCard Packet, visit:

http://radioministries.org/k4set/packet/index.htm
and TAPR, Tucson Amateur Packet Radio.

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.
MixW Version 2.19 Help by Scott Hill, K6IX

MixW: VHF Packet Operation
_____

MixW has many options for Packet operation including both HF and VHF configurations. For HF packet information see HF Packet Operation.

TCP/IP over AX.25 packet radio protocol is also supported. See TCP/IP over AX.25.

MixW offers many user settable timing parameters, as well as the ability to send beacons, and act as a digipeater.

Switch to the Packet mode by selecting Mode | Packet. Next, open the settings dialog box by selecting Mode | Mode settings. This will bring up the following dialog box:
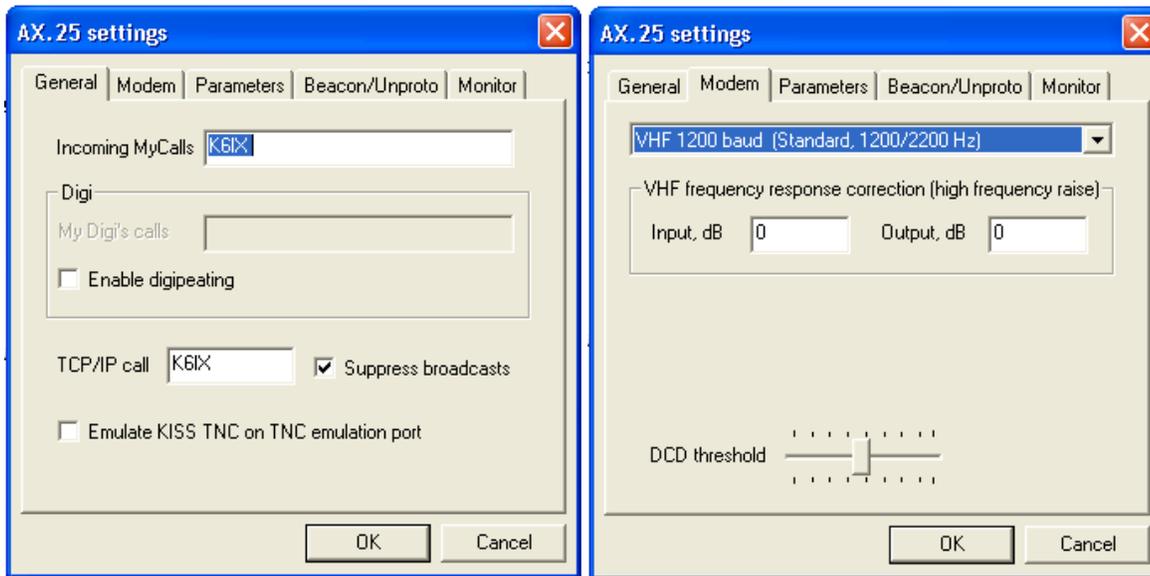
Enter your callsign in the general tab, and select the VHF 1200 baud Standard (or the settings you wish to operate) in the Modem tab. If you want MixW to also act as a digipeater, enter your digipeater call sign, and check the box to enable digipeating. The "use PSK" and the "OEM" checkboxes should be left unchecked for most operations. The Parameters, Beacon/Unproto, and Monitor tabs can be ignored for the present. You can customize your packet timing parameters in order to facilitate connecting to certain BBSs or other unique situations by clicking on the Parameters Tab. The default settings here should get you started. The Beacon/Unproto tab can be used to set your beacon text and parameters, and the Modem window can be used if you have a hardware TNC and want to use it instead of your soundcard for packet operation.

Next you need to find a packet station or PBBS to connect too. Unlike HF packet, VHF tuning is almost automatic, so long as you're using a standard VHF/UHF FM radio. Simply tune your radio to the packet frequency you are interested in. You will notice that you cannot tune MixW by clicking in the Spectrum or Waterfall displays as you do for the other modes. This is because MixW assumes you are tuned right on frequency (due to the nature of VHF/UHF FM operations) and will be using the standard audio tones for the packet mode you have selected.
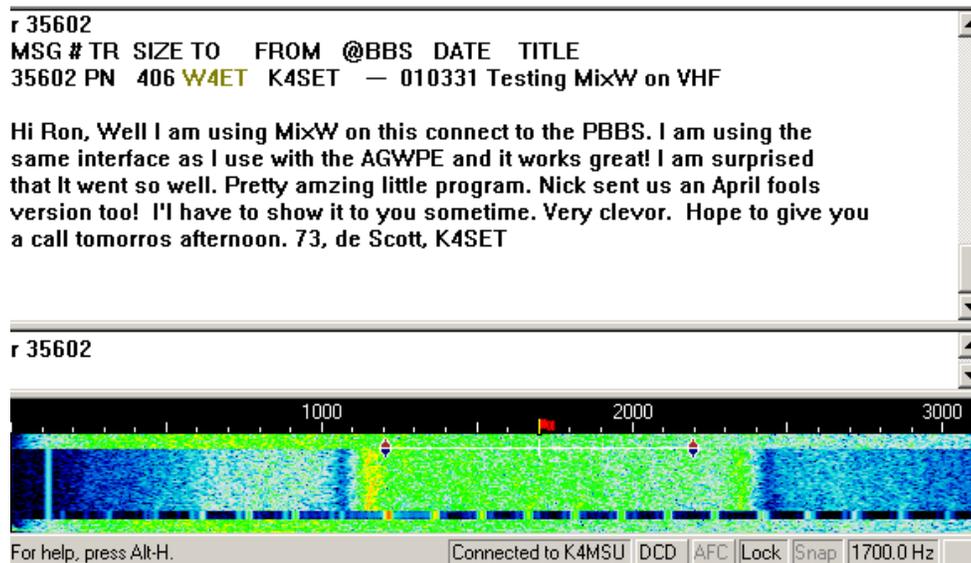
After first monitoring the frequency to determine that the station or PBBS you want to connect to is on the frequency, you then initiate the connect command. To do this, open the connect dialog box by selecting Mode | Connect, which will bring up the following dialog box: (You can also bring up the connect dialog by simultaniously depressing the Ctrl-Alt-c key combination.)
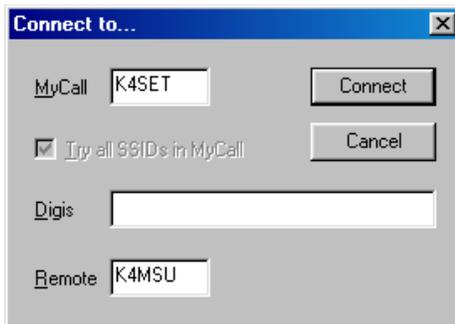
Enter your callsign in the MyCall box and the callsign of the station or PBBS you wish to connect to in the Remote box. If you are planning to connect through a Digipeater path, enter that in the Digis box. Next, click on the connect button and MixW will initiate a connection with the remote station.

As you can see in the following screenshot, I have connected directly to the K4MSU PBBS (our radio club operates this PBBS on 145.01MHz in Murray, KY) and I have written a message to my friend Ron, W4ET, who is also a user of this
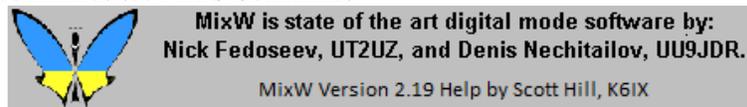
PBBS. What you are seeing here is the message I sent previously sent back to us by my use of the R <message #> command to read back the message.

```
r 35602
MSG # TR SIZE TO    FROM  @BBS  DATE    TITLE
35602 PN   406 W4ET  K4SET  —  010331 Testing MixW on VHF

Hi Ron, Well I am using MixW on this connect to the PBBS. I am using the
same interface as I use with the AGWPE and it works great! I am surprised
that It went so well. Pretty amzing little program. Nick sent us an April fools
version too!  I'l have to show it to you sometime. Very clevor.  Hope to give you
a call tomorros afternoon. 73, de Scott, K4SET
```

```
r 35602
```



```
For help, press Alt-H.          Connected to K4MSU | DCD | AFC | Lock | Snap | 1700.0 Hz |
```

When operating packet you will notice that each station must acknowledge accurately receiving the other station's packets (this happens automatically through the software), which results in short bursts of activity while each station responds. During poor band or path conditions it may take several attempts before each station accurately receives the other's packets.

When you are finished with the QSO, or PBBS session, you must disconnect from the remote station by selecting Mode | Disconnect, which will send the disconnect string to the remote station and end your connection and QSO. **Note:** If you are connected to a PBBS, you should first log off the BBS with the Bye command, then if you remain connected you can initiate the disconnect command, but the BBS will most likely initiate the disconnect process.

For a list of typical PBBS commands see PBBS Commands

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MixW Version 2.19 Help by Scott Hill, K6IX

MixW: HF Packet Operation
_____

MixW has many options for Packet operation including both HF and VHF configurations. For VHF packet information see VHF Packet Operation. MixW offers many user settable timing parameters, as well as the ability to send beacons, and act as a digipeater.

Switch to the Packet mode by selecting Mode | Packet, or by clicking on the Mode box in the Status bar and selecting Packet. Next, open the settings dialog box by selecting Mode | Mode settings. This will bring up the following dialog box:
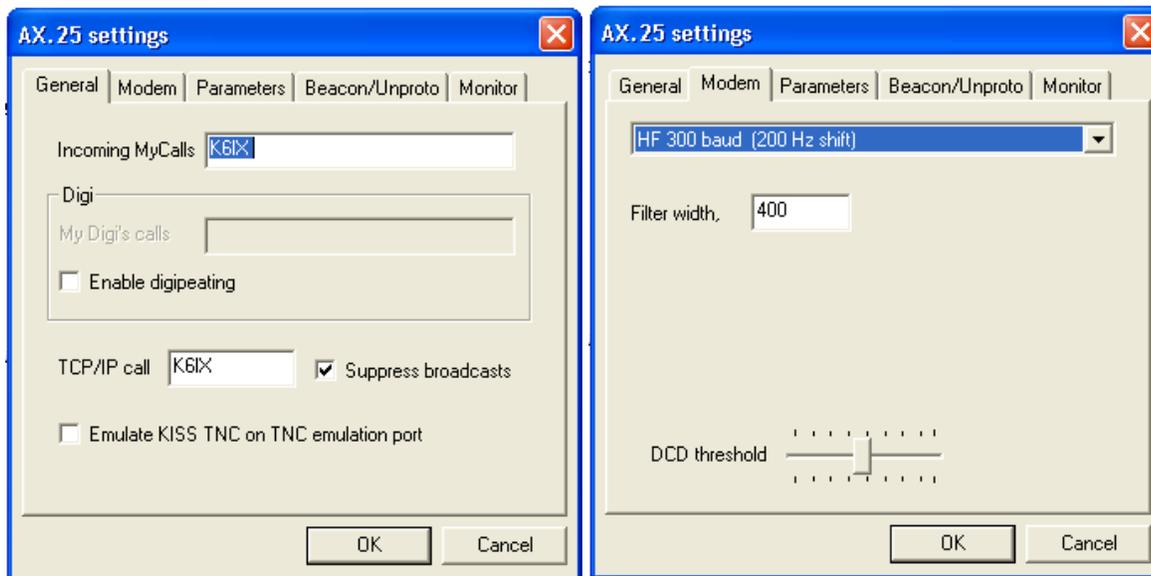
Enter your callsign, in the General tab, and select "HF", in the Modem tab, for the mode you wish to operate. All HF packet operations are using 300 Baud at the present time, as conditions on HF do not support the higher baud rates. If you wish to act as a digipeater, enter your digipeater call sign here and check the box to enable digipeating (this is more common for VHF packet). The Parameters, Beacon/Unproto, and Monitor tabs can be ignored for the present. You can customize your packet timing parameters in order to facilitate connecting to certain BBSs or other unique situations by clicking on the Parameters tab.

Next you need to find a packet station or PBBS to connect too. The following screen shot shows a packet QSO as tuned in and monitored in the waterfall display:
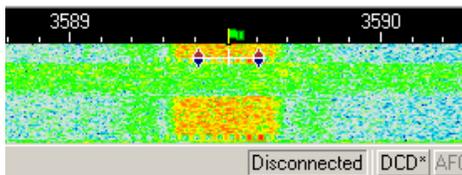
Tune a Packet signal by pointing right in the center of the signal with the mouse and clicking the left mouse button. You may need to fine tune by using the CTRL-arrow keys. The text being sent by the station will then appear in the Receive Window. The Packet tuning indicator is two diamonds which are linked together with a bar. The diamonds will move together to track and tune Packet connections.

Once you have tuned in and monitored packet activity you must connect to the station or PBBS you have received in order to have a QSO or PBBS session. To do this, open the connect dialog box by selecting Mode | Connect, which will bring up the following dialog box:
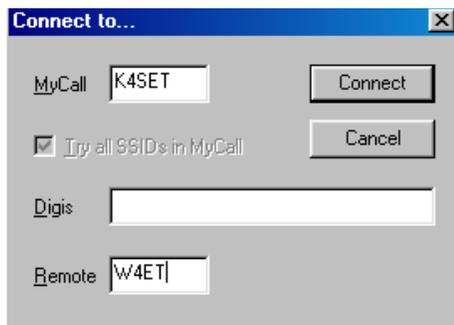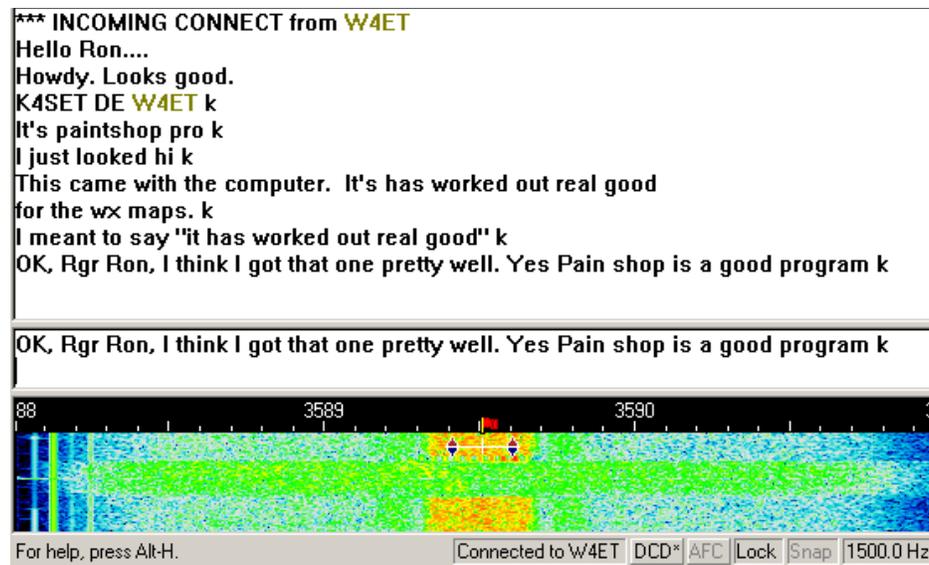

Enter your callsign in the MyCall box and the callsign of the station or PBBS you wish to connect to in the Remote box. If you are planning to connect through a Digipeater path, enter that in the Digis box. Note: Digis are more common on VHF

packet than HF.

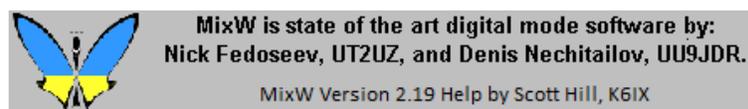Next, click on the connect button and MixW will initiate a connection with the remote station.

As you can see in the following screenshot, we have now connected directly to Ron, W4ET. (Actually, in this case Ron imitated the connection, and my station automatically connected to him without me having to do anything:


```
*** INCOMING CONNECT from W4ET
Hello Ron....
Howdy. Looks good.
K4SET DE W4ET k
It's paintshop pro k
I just looked hi k
This came with the computer.  It's has worked out real good
for the wx maps. k
I meant to say "it has worked out real good" k
OK, Rgr Ron, I think I got that one pretty well. Yes Pain shop is a good program k
```

```
OK, Rgr Ron, I think I got that one pretty well. Yes Pain shop is a good program k
```

| 88 | 3589 | 3590 | 3 |

| For help, press Alt-H. | | Connected to W4ET | DCD* | AFC | Lock | Snap | 1500.0 Hz |

We can type back in forth this way. When doing so you will notice that each station must acknowledge accurately receiving the other station's packets (this happens automatically through the software) so you will see short bursts of activity while each station responds. During poor band or path conditions it may take several attempts before each station accurately receives the other's packets.

When you are finished with the QSO, or PBBS session, you must disconnect from the remote station by selecting Mode | Disconnect, which will send the disconnect string to the remote station and end your connection and QSO. Note: If you are connected to a PBBS, you should first log off the BBS with the Bye command, then if you remain connected you can initiate the disconnect command, but the BBS will most likely initiate the disconnect process.

For a typical list of PBBS commands see PBBS Commands

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

MixW: TCP/IP over AX.25
_____

MixW 2 supports TCP/IP over AX.25 (datagram mode). This means that you can use standard Windows' software to communicate with other TCP/IP systems (UNIX/Linux, AGW Packet Engine, Flexnet, MixW 2) over a VHF radio channel.
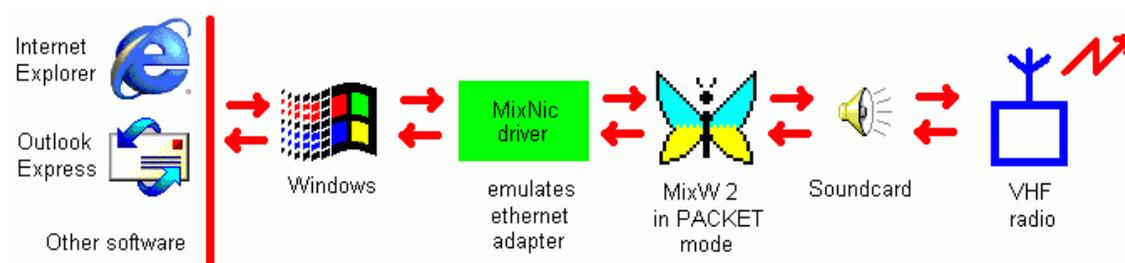
Download the virtual network adapter driver for Windows 98/ME/2000/XP from Nicks website by clicking here:
http://http://mixw.net/files/MixNic6.zip

Or, for early Windows 98 versions:
http://mixw.net/files/MixNic6Old.zip

Unzip the files to a separate folder and see the ReadMe.txt file for installation instructions.

These drivers have been tested with Windows 98 SE 4.10.2183A, Windows 2000 5.00.2195 SP2, Windows XP 5.1.2600.
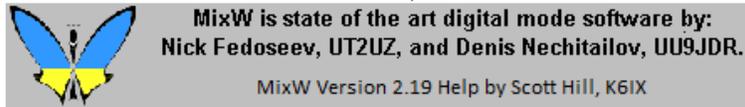
MixW: PBBS Commands

_____

MSYS PACKET BBS COMMAND SUMMARY
Version 1.18 (The first letter alone will invoke most major commands: example, B = Bye)
Note: The MSYS commands are used on many other PBBSs as well.

A Commands
Abort..................Stop current action

B Commands
Bye....................Disconnect

C Commands
Conference......Multi-user/DX Node

D Commands
Download........Download from FILES

G Commands
Grep..................String search file

H Commands
Help..................Help

I Commands
Information......PBBS hardware
Info...................Basic Information
ID......................Port definitions

J Commands
Just Heard......Log
JB.....................BBS Stations
JD.....................Digipeaters
JG.....................Gateways
JK.....................K and KA nodes
JM....................MSYS PBBSs
JN.....................Net/Rom
JT.....................TCP/IP protocol

K Commands
Kill....................Kill a message
KM....................Kill mine
KT....................Kill traffic

K-Nodes........K-Node output

L Commands
List.................Message headers
L x....................List category x
LC....................List categories
LM....................List mine
LN....................List not read
LT....................List traffic
LL....................List last message
LL #.................List last #
LO #................List older #=yymmdd
LU..................List unread to you
LY..................List read to you
LW.................List weather
L?...................List ? forward
L<< x..............List fm x=callsign
L>> x..............List to x=callsign
L@ PBBS.....Messages to PBBS
L #..................List since #
LL #................List last #
L # #...............List from # to #
L"x"................List with x=string
L'x'.................List with x=sTrInG
L$...................List bulletins

M Commands
Message......Message of the day

N Commands
The N commands are used while to give the BBS your information, either the first time you log on, or if you need to edit your information:
Name...........First name
NH.................Home board
NQ.................QTH=City,
NZ..................Zip code

P Commands
Path...............Path to a user
PF..................Path to a PBBS
PC..................Request a callsign

R Commands
Read.............Read a message
R x.................Read all category x
R@ xxxx.......Read all at xxxx BBS
R> xxxx..........Read all to xxxx
R< xxxx..........Read all from xxxx
RM................Read Mine
RE.................Read for export
RH.................Read with headers
RN.................Read only text
RP.................W/O mark as read
REPly #.........Reply auto title
REP # ....Reply to given message number. If you put a period after the number, a title will automatically be generated. Same as SR command.
The following variations of the R command read messages:
R # # .... Reads the given message numbers Ex: R 12734 11521 27185
RM ....Reads your messages (Read Mine)
R ....category Reads the messages in a given category ("TO" field). Ex: R SALE
R> ....callsign Reads msgs with given "TO" field

R< ....callsign Reads msgs from given callsign
R@ ....callsign Reads msgs with given @BBS Ex: R@ ARRL
RH # # ....Like R but displays all the R: lines as well (Read Headers)
RP # # ....Like R but doesn't mark msgs as read (Read Preview)
RN # # ....Like R but gives msg text only (Read Noheaders)
RE # # ....Reads the given message numbers in export form (Read Export)
REM ....Reads all messages to you in export form (Read Export Mine)
#RS ....Reads all messages to SYSOP (Read Sysop)
#RES..............Reads all messages to SYSOP in export form (Read Export Sysop)
#R* ....Reads held messages showing text
#R+ ....Reads held messages showing why held verbosely
#R- ....Like R+ but very concise
Typically, after a screefull of lines is displayed on your terminal, you will be asked:
More? [Y]es, No or Continuous
Press just return for next screenfull, N to quit reading this message or category), or C to display all the rest without pausing.
The number of lines per screen is set by the X command.

> REQDIR
To list files in subdirectory XXX, put /XXX in the title of a msg to REQDIR.
For information on how to request a file, send a msg to REQFIL and put
REQFIL.HLP in the title.
> REQFIL
To request a file, send a private message to REQFIL at this BBS. Put in the
title the name of the file you want. If the file is in a subdirectory,
include the name(s) of the subdirectories. Examples:
SP REQFIL @ WA8BXN
REQFIL.HLP

S Commands
The S command is used to send messages. It several formats:
SP call @ bbscall.haddr Send a private msg Ex: SP K8EIW @ WB8BII.OH.USA.NA
ST zipcode @ NTSst Send traffic msg Ex: ST 44070 @ NTSOH
SB category @ route Send a bulletin Ex: SB NEED @ ALLOH
SR msg# Send reply Ex: SR 12723 or SR 12723.
In SB if call is a user of this system you can omit the @ bbscall.haddr
In ST, NTSst means to replace st with the state its going to: OH for Ohio, etc.
In SR, if you put a period after the msg #, a title will automatically be made
by preceeding the original title with RE:
IMPORTANT: SR tries its best to determine where the reply should go, but
it is not always perfect! The same applies to the REP command.
Never uses SSID's in callsigns (ex: don't use WA8BXN-2, just use WA8BXN)
Hierarchical addresses are of the form state.country.continent. Other parts
may be used by a particular BBS, if you know them, use them.
When sending personal messages to a distant bbs, it is a good idea to put
the destination city and state in the title.
When you are done typing your message, end it with either ^Z (Control-Z) or
Putting * at the beginning of a line makes it a comment.
It also suppresses the next command prompt (but the system will
be waiting for another command). * is useful to answer the SYSOP if you
get a MESSAGE FROM SYSOP ...

Send...........Send a message
^A................Abort message
CC...............Carbon copy
SP...............Send personal
ST...............Send traffic

T Commands
The T cmd is used to connect to the sysop's keyboard. This if the sysop is present you may enter into a direct conversation.
If there is no response from the sysop in 60 seconds you will be returned to the BBS. TCP/IP Telnet users note: Server 87
connects directly to the keyboard without going through the bbs.

U commands
The U cmd lists the current users of MSYS and what they are doing. The UP command may be used to upload ASCII files. You must be authorized by the SYSOP to upload files. After you use the UP command you will be asked the file name to upload. Follow the prompts given by the command.

V Commands
The V command gives the version of this software.
Version........Version

W Commands
The What command lists the available files for downloading. The format: W - Lists all files with sizes. A directory name may be specified to list files names in directories that appear in the list.
What...........Download list
W x..............What in x=subdir

X Commands
The X command can be used to set a variety of options. If no argument is given, X simply toggles and displays the new Expert status. If a number is given after X, this is the number of lines to display for a command before asking More? To continue displaying the current message when More? is sent press return. To abort the message, type N and then return. This facility has been added to prevent a long message from scrolling off your screen faster than you can read it. Experiment with different values until you find one that pleases you. To not use this facility, set the number of lines to zero. Examples:
X.........Toggle expert
X 20 (pause after every 20 lines) X 0 (don't pause ever)
XF Set "fast" mode: BBS will put more than one line per packet
XS Set "slow" mode: BBS will put only one line per packet.
Note: If you have very good path to bbs, use XF. If you have a poor
path to bbs, use XS since short packets make it through easier.
XC............. toggles the automatic display of msg catagories when you connect to the
bbs and are using non-expert mode.
XR toggles the automatic asking if you want to reply to a msg after you read
it. Can be useful if you get a lot of personal mail.
XU toggles the automatic display of Unread mail when you connect.
X #............Lines per page

Y Commands
Yapp...........Down and uploads
YW..............YAPP Directory
YD................Download a file
YU................Upload a file
YW ....Lists available files for YAPP Download
YD filename Downloads specified file using YAPP protocol
YU filename Uploads specified filename using YAPP protocol

*....................Comment to sysop

^ZH.................Conference help
^ZQ or /ex......Return to PBBS
^ZU.................List users
^ZA #..............Invite user on #

^Z gets you this file, as you may already know!
SP REQFIL @ WA8BXN
XXX\EWFILE.DAT
^Z
would get you file NEWFILE.DAT from directory XXX.
SP REQFIL @ WA8BXN
STUFF.BAS @ K8EIW
^Z
would send the file STUFF.BAS back to you at BBS K8EIW, instead of the one
from which you sent the message.

NOTE: YOU CAN REQUEST ONLY ONE FILE PER MESSAGE TO THE SERVER!

NETWORK NODE COMMANDS
BBS...........Connect to the PBBS
Bye............Disconnect
Connect CALL...Connect to call
C# CALL...C on port # to call
Help...........Help
Nodes..........Nodes heard
Justheard......Limited output JH
Nodes CALL..Info on node
Ports..........Port information
Routes.........Direct connect nodes
Route CALL..Other node
State Talk...........Page Sysop
Users..........Users/nodes

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MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Pactor
_____

Pactor Introduction and Theory

Pactor Operation

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.
MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Pactor Intro and Theory
_____

From the website of RICHARD B. GRIFFIN, NB6Z

I. Introduction
PACTOR, specially designed for operation in noisy and fluctuating channels, is an improved half-duplex synchronous ARQ system combining the reliability of Packet with the fixed AMTOR time frame.
Principal design considerations
PACTOR comprises all important Packet (2-way) characteristics:

- fixed timing structure and full synchronism to ensure maximum speed
- fast and reliable changeover / break-in
- required bandwidth less than 600 Hz
- 100% ASCII compatible (true binary data transmission)
- extremely low probability of undetected errors (16 bit CRC)
- independent of shift polarities
- no multi-user overhead in a narrow-band channel
- inexpensive hardware (Z80 single-board)
- high operational comfort (built-in message storage system, etc.)
- listen-mode (monitor)
- FEC-mode (CQ-transmissions etc.)

As a novelty in Amateur RTTY, some additional powerful features have been realized:

- optimal coherent mode, i. e. system clocks locked to frequency standards (e.g. DCF77, TV deflection signals and other high precision broadcasts)
- online data compression (Huffman coding)
- automatic speed change (100/200 baud) without loss of synchronization
- fully acknowledged link termination (no QRT-timeout required)
- memory ARQ (even noisy packets can be restored)

II. System Details

1. Timing

The basic Pactor transmission frame is very similar to AMTOR; blocks (packets) containing data information are acknowledged by short control signals sent out by the receiving station.

Shift levels are toggled with every cycle in order to support memory ARQ. Since the shift polarity is clearly definined at synchronization time, any conventions concerning 'mark/space' become obsolete.

- cycle duration : 1.25 sec
- packets : 0.96 sec = 192 (96) bits at 200 (100) baud
- control signals: 0.12 sec = 12 bits, each 10 msec long
- Control Signal-receive gap : 0.29 sec

Change of transmission speed only alters the internal packet structure; all other timing parameters remain constant.

2. Packets

General packet structure:

/header/..20 (8) data bytes at 200 (100) baud../status/CRC/CRC/

header : This byte enables fast synchronization and delivers auxiliary information (memory ARQ, listen mode)

data : arbitrary binary information

status : system control byte (2 bit packet number, tx-mode, break-in request, QRT)

CRC : 16 bit cyclic redundancy check based on CCITT polynomial $X^{16}+x^{12}+x^5+1$, calculated over the entire packet (except header)

3. Control signals (CS)

Four CS are used. As a compromise between reliability and fast detection, a CS length of 12 bit was chosen.

CS1: 4D5 CS2: AB2 CS3: 34B CS4: D2C (all hex numbers, LSB right)

The mutual Hamming distance is 8 bit, thus minimizing the chance of receiving a false CS. CS1/2 and CS3/4 form symmetrical pairs (bitreverse patterns). CS1..3 have the same function as their AMTOR counterparts; CS4 serves as the speedchange control. In contrast to AMTOR, CS3 is transmitted as head portion of a special changeover packet.

The calling station ('master') sends special synchronization packets: /head (100 bd)/..address (8 bytes, 100 bd)../..address (8 bytes, 200 bd) Normally, the receiver only uses the 100-baud-section to achieve a fast synchronization. The 200-baud-section supplies additional information about the channel quality: if it is received correctly, the first CS will be CS4, otherwise CS1 is sent. After in turn having synchronized a CS4 or CS1, the master will continue with sending normal data packets at 200 or 100 baud, respectively. The first transmitted characters contain the 'system level number' (PACTOR software-version), followed by the master address (callsign).

4. Changing the transmission direction

Similar to AMTOR, the receiving station (RX) can change the transmission direction whenever it has received a valid packet. For this purpose a special changeover-packet is transmitted, starting at the CS time frame. The transmitting station (TX) will switch to RX mode immediately after it has received the CS3 which forms the first section of the changeover-packet. It then reads in the rest of that packet and transmits a CS (CS1 and CS3 = acknowledge, CS2 = reject) timed at the last three bytes of the former packet frame.To force a break in, the TX sets the BK-status-bit (this corresponds to AMTOR '+ ?').

5. Speedchange

Speeddown only being useful in poor conditions or at low data input rates (e. g. manual typing), both directions are treated unsymmetrically.

i) Speeddown

The RX may request speeddown after any incorrectly received packet by sending CS4, which immediately forces the TX to build up 100-baud-packets (any unconfirmed 200 baud information is repeated at low speed).

ii) Speedup

Any valid packet may be confirmed with CS4, forcing a TX speedup. In case the following high-speed-packet is not

acknowledged after a number of tries, the TX will automatically perform a speeddown.

6. Termination of a PACTOR contact

Cutting an ARQ link inevitably leads to the problem that information has to be transmitted without final acknowledgement (Second WAA theorem). Pactor applies special QRT packets, providing an expensive but rather effective solution. These packets contain an active QRT status bit and the RX address in byte-reverse order (low speed pattern). If this address is found during the standby synchronization procedure, the RX responds with a single transmission of the final CS (The timing relations before stby are stored). This method will always guarantee a well-defined QRT.

7. Data Compression

Character frequency analysis of typical English or German texts shows that the average amount of information per character does not exceed 4 bits. For that reason, ASCII text transmissions often carry a redundancy of 50%, which could be avoided by using a vriable length code matched to the character distribution.The most popular example of such a code is the Morse code; PACTOR data compression mode applies Huffman coding with nearly optimum efficiency, yielding up to 100% speed gain. Every packet contains a compressed data string; character code lengths vary from 2 to 15 bits.

8. Memory ARQ

In conventional ARQ systems the TX has to repeat a packet until it has been received completely error-free. It is evident that the probability of receiving a complete packet dramatically decreases with lower S/N ratio. The only way to maintain the contact in that case is to shorten packet length and/or to apply error correcting codes which in turn will greatly reduce maximum traffic speed when conditions are good. The method chosen by WAA Research Group is to sum up corresponding bit samples of subsequent packets and to test if the mean value (reduced to a 0/1-decision) passes the CRC. To keep quantizing errors small, the samples are taken from the FSK-demodulator low-pass-filter output by means of an 8-bit AD-converter. Assuming white Gaussian noise, this accumulation method - also known as 'memory ARQ' - will obviously converge even at a WA4EGT, QRA WA2MFY/SYS1: low S/N ratio. Furthermore, since shift levels are toggled with every transmission, constant interfering signals within the receiver passband will not affect the resulting mean value. To prevent accumulation of old request packets, the header is inverted with every new information packet, thus serving as a RQ indicator (similarity test).

9. Listen Mode (Monitor)

This mode resembles Packet Radio monitoring: the receiver scans for valid packets which are detected by CRC match. This 'brute force' method was chosen in order to ensue maximum flexibility, although it consumes a considerable amount of the available CPU capacity.

10. FEC Transmissions

CQ and bulletin transmissions are supported by means of a special non- protocol mode. Packets are transmitted with one or more repetitions; the CS receive gap is omitted. Since the listen mode does not require synchronization, the transmitting station possesses great freedom of selecting packet repetition rate and speed.
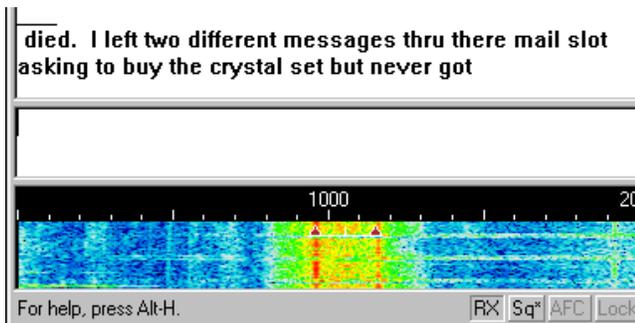
11. Practical Aspects

The first PACTOR programs were running on 'breadboarded' Z80 singleboard- computers. These early experiments led to the development of a stand-alone 'PACTOR- Controller' with built-in modem and tuning-display.The conventional operating modes BAUDOT and AMTOR were added in order to maintain compatibility and - what might be more interesting - to allow easy comparisons. Assuming typical conditions, PACTOR traffic can be expected to run 4 times faster than over an AMTOR link.
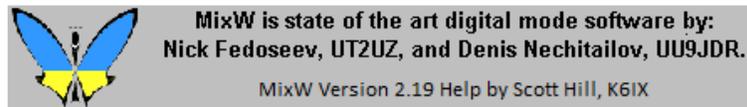

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX
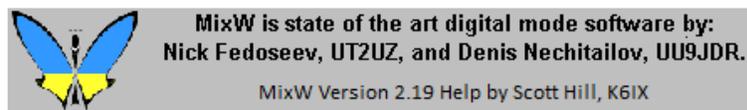
MixW: Pactor Operation
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MixW supports Pactor receive (listen mode) only via the soundcard interface. To transmit Pactor with MixW you must use a hardware TNC. See the TNC Configuration and Operation topic.

To receive Pactor without a TNC, set the mode for Pactor by selecting Mode | Pactor from the main menu, or by clicking on the Mode box in the Status Bar and selecting Pactor. Pactor sounds like chirping bursts of packet like transmissions. The following picture shows the waterfall-tuning window tuned to a Pactor QSO:

died. I left two different messages thru there mail slot
asking to buy the crystal set but never got

As you can see, the width is similar to RTTY and it also utilizes the same two-diamond-with-a-bar indicator used by RTTY, MFSK, and packet.

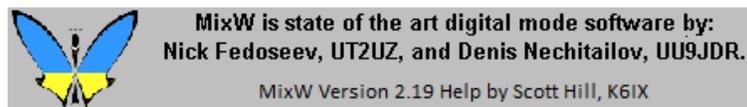MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.
MixW Version 2.19 Help by Scott Hill, K6IX

MixW: PSK
_____

PSK Introduction and Theory

PSK31 Operation

PSK63/125 Operation

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.
MixW Version 2.19 Help by Scott Hill, K6IX

MixW: PSK31 Intro and Theory
_____

PSK31 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".

PSK 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:
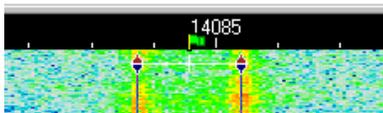
Picture of RTTY QSO in the MixW display.
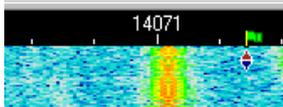
Picture of a PSK31 QSO in the same display.

PSK31'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

Note: Because this is commercial software, Peter Martenez, G3PLX's Introduction and Theory of PSK31 cannot be included as part of these help files, but these really should be reviewed for a better understanding of PSK and its development. Peter Martenez's outline and theory of PSK31 can be viewed on the website of MixW beta tester and help file contributor, RICHARD B. GRIFFIN, NB6Z at the following link: http://www.teleport.com/~nb6z/psk31.htm

MixW has full BPSK31 and QPSK31 capabilities, but Nick did not use the G3PLX source code to implement it. By using his own source code, Nick is in keeping with Peter's guidelines for the use of PSK31 in commercial software.

The MixW team is very grateful to Peter for PSK31, a great gift to the radio art.
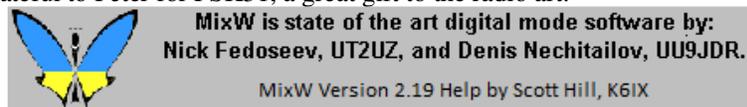
MixW: PSK31 Operation
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With thanks to RICHARD B. GRIFFIN, NB6Z

PSK31 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. See the Basic Set Up topic in the Configuration and Set Up section for additional information.

Transceiver Settings
Fine Tuning: If your transceiver is equipped with a "FINE" tuning feature, always use that for PSK31 tuning, but you will find that most of your adjustments are made in software, and not with the transceiver's VFO. Some older rigs are not stable enough for PSK31 operation and will drift considerably off frequency.

USB: USB is the convention for PSK31 operation in all bands. For BPSK31 either sideband can be used, but with QPSK31 the sender and receiver must be using the same sideband, or one station must be inverted (see Inversion in the Configuration topic of the Configuration and Set Up section.

Filtering: Optimum filtering depends on your transceiver's SSB filtering options and its IF rejection characteristics. Wide filtering will enable you to work the largest spectrum without retuning your transceiver, but can also cause problems when there are strong adjacent signals. A narrow (CW or FSK) filter may help significantly with some radios and situations. Many transceivers, however, do not have narrow filtering options while operating in SSB modes. Consult your manual and experiment for the optimum configuration for your setup and conditions. The following waterfall display shows MixW's panoramic display while using a wide filer setting on the transceiver:
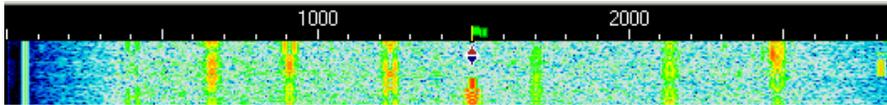
Here there are 8 different QPSK31 QSOs we could copy with the simple click of the mouse in roughly 3 KHz of spectrum. You can even see the bottom of an MFSK QSO in the far right hand side of the display.

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

MixW Settings

Mode will be set to either BPSK31 or QPSK31. Most PSK31 operations are BPSK31 unless conditions will benefit from the limited error correction offered in the QPSK31 mode.

AFC should be **on** to assist in tracking PSK31 signals. The one exception is when a strong adjacent signal pulls you off of a weaker station you are working.

Lock should be **off** so you will be transmitting on the same frequency you're receiving. The exception here would be if you're working a station that is drifting and want that station to always tune to your more stable "locked" transmit frequency, or you are working split.

Squelch and Threshold can be used and adjusted to suit your operating preferences.

Inverted is grayed out for BPKS31 operation, and is never used. It may be needed while operating QPSK31 however. If you are having difficulty copying a QPSK31 signal, try clicking Mode | Inverted and see if you start to print it. **Note:** This feature works differently in MixW than most other SoundCard digital programs, so please read and understand the information about inversion in the Configuration and Set Up Section.

Receiving PSK31
PSK31 signals display as two closely spaced parallel lines in the Spectrum Window. Tune in a PSK31 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.
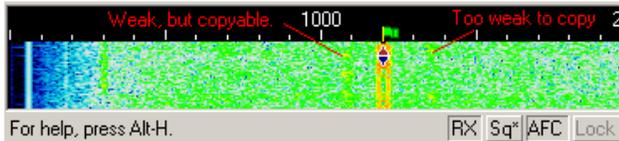
In this screen capture of a portion of the Spectrum Window of an actual MixW screen, the bright orange stripe with the diamond-shaped cursor in the middle is a strong PSK31 station, the one to the left is a weak PSK31 station (yellowish streaks), but would likely still print readable copy, and the very faint signal to the right is a PSK31 station that is too weak to copy enough to sustain a QSO.

PSK31 is less than 40Hz in bandwidth, so it is virtually impossible to manually tune to the correct frequency with the transceiver's VFO, or even to manually touch up the tuning because the increments are so small. However, if your Rig is equipped with "FINE" tuning, Always use that when you're in the BPSK31 and QPSK31 modes.

Transmitting PSK31
To transmit to a station, first tune it as indicated above. Type outgoing text in the Transmit Window. Press the TX/RX 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 TX/RX button again. Pressing ESC will abort transmission and return MixW to receive mode, but the last several characters typed will not be transmitted. This process can also be automated with the use of MixW's Macros.

Note: PSK31 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.

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

See the Basic Set Up topic for adjusting your sound card volume controls. PSK31 is extremely sensitive to proper adjustment of both the volume and record level setting of your sound card.
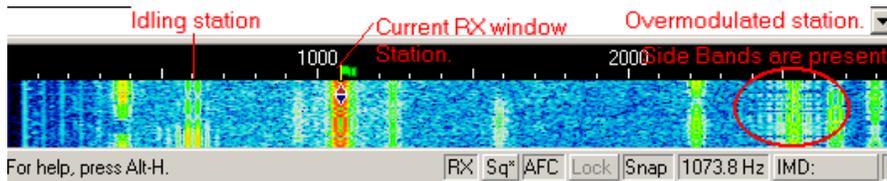
This screen capture of a MixW screen shows several PSK31 stations. The station to the left of our QSO is idling (not typing) and the two desired sidebands of the PSK31 signal can clearly be seen as parallel lines. Also visible are two more, fainter parallel lines on each side of the solid parallel lines at the bottom of this signal, which are unwanted sidebands, produced by slightly overdriving the transceiver. It looks as if this station is "setting" the soundcard output level. It was too strong at first and produced the unwanted side bands, and it looks about right where they ended up at the top of the display. The signal marked and circled as "over modulated station" also has the wide unwanted sidebands. Notice how close the sidebands are to interfering with the QSO directly to the right of them.

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

For these and other general operation techniques see the Operation Section.
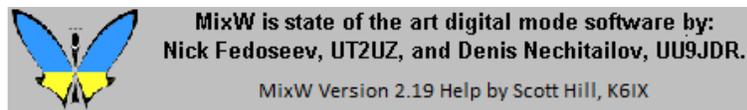
MixW: PSK63/125 Operation
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PSK63 & PSK125 Basics
BPSK63, BPSK125, QPSK63 & QPSK125 are provided as a variation of BPSK31 & QPSK31 by changing the BAUDRATE using either a macro command or the Settings Dialog. Two macros are suggested, one for switching to PSK63/125 and one for changing back to PSK31.

PSK63 will operate exactly like PSK31, except that the signal will be twice as wide, and you can transmit twice as fast (if you can type that fast). By the same token, PSK125 will be 4 times as fast.

MixW will properly recognize the mode in the Log based on the baud rate.

Macro to change to BPSK63: <MODE:BPSK31><BAUDRATE:62.5>

Macro to change to BPSK125: <MODE:BPSK31><BAUDRATE:125>

Macro to change back to BPSK31: <MODE:BPSK31><BAUDRATE:31.25>

You can also change the baud rate by selecting the BPSK31 Settings Dialog
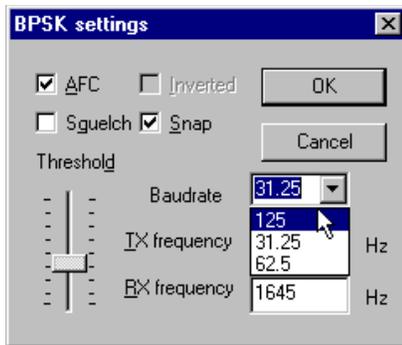
NOTE: PSK63 & 125 are normally found above the traditional PSK31operating frequencies rather than intermixed with them since PSK63 & 125 require more bandwidth. If you change from PSK31 to PSK63/125 during a QSO you risk expanding into another user's signal, which will not improve your image as a courteous and considerate operator.

MixW: MFSK
_____

MFSK Introduction and Theory

MFSK Operation

MFSK Image Mode

MixW: MFSK Intro and 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).
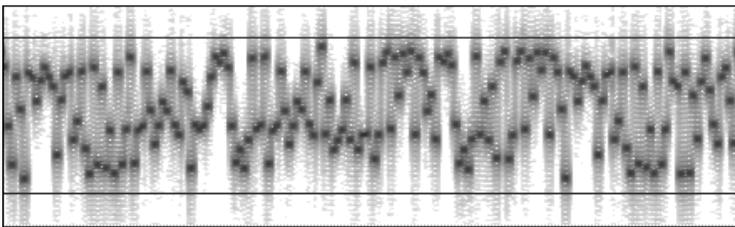
Fig. 1. Spectrogram of an MFSK16 Signal

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 log216 = 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.
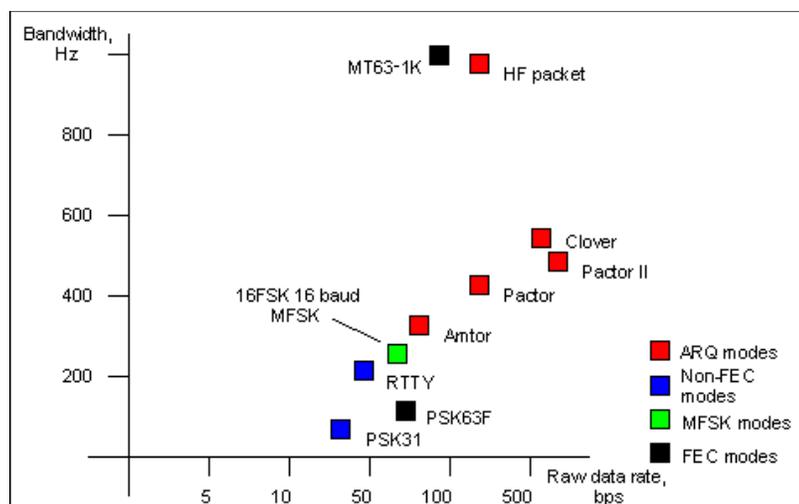
Fig. 5. Graph showing raw data rate of various digital modes

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/

MixW is state of the art digital mode software by:
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MixW Version 2.19 Help by Scott Hill, K6IX
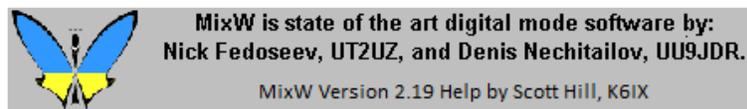
MixW: MFSK Operation
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MFSK16 uses approximately the same bandwidth as 170Hz shift RTTY and so your MFSK16 transceiver settings can be roughly the same as those used for standard shift RTTY.

Transceiver Settings

Fine Tuning: If your transceiver is equipped with a "FINE" tuning feature, always use that for digital mode tuning once you have found the general area of the signals, however, most of your adjustments can be made in software, and not with the transceiver's VFO if you prefer. Some older rigs are really not stable enough for MFSK operation and will drift considerably off frequency.

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 (see: Inversion in the Configuration Topic).

Filtering: Optimum filtering depends on your transceiver's SSB filtering options and it's IF rejection characteristics. Wide filtering will enable you to work the largest spectrum without retuning your transceiver, but can also cause problems when there are strong adjacent signals. A narrow (RTTY or FSK) filter may help significantly with some radios and situations. Many transceivers do not have narrow filtering options while operating in SSB modes.

MixW Settings

Mode: Click on the mode box in the status bar and select MFSK. Then click on the mode box in the status bar again and select "Mode Settings". This brings up the following dialog box:
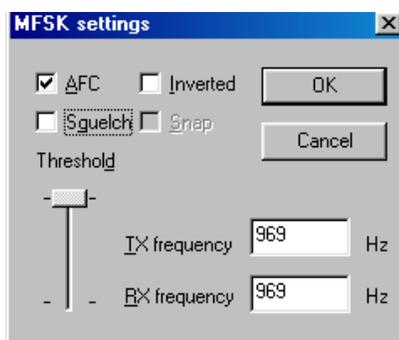
TX and RX frequencies are set to the location of your cursor is in the spectrum window. Keeping this around 1500 Hz, will keep your transceiver operating close to the center of its pass band.

AFC, which should always be set to ON for MFSK operation due to the critical nature of MFSK tuning.

Squelch and the **Squelch threshold**can be adjusted to limit garbage characters, but you can also miss characters by using squelch as well.

The MFSK tones can also be **inverted** by checking the Inverted box. **Note:** This feature works differently in MixW than most other SoundCard digital programs, so please read and understand the information about inversion in the Configuration Topic.

Tuning MFSK
You can easily recognize the sound of MFSK once you have heard it. It sounds a lot like RTTY, only with multiple, rather musical tones. The following tuning display shows the distinctive waterfall pattern of MFSK16:
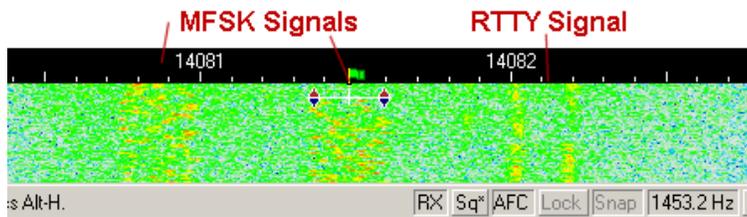
As you can see, the multiple MFSK tones are dispersed throughout the bandwidth of the signal while the two distinct Mark and Space tones of the RTTY signal are at the edges of the bandwidth. You can also see that MFSK16 uses just slightly more bandwidth than the standard 170Hz RTTY signal. To tune an MFSK signal, click the cursor in the middle, then adjust it to either side by using the CTRL-Arrow keys until you start receiving text in the RX window, and the AFC locks onto the signal. Because of interleaving you may find that it takes a little longer to tune MFSK than RTTY or even PSK. You will also notice that the RX text will come in batches instead of a steady stream.

Transmit:
To switch between transmit and receive press the Pause/Break key, click on the TX/RX box in the status bar, or select Options | RX, or Options | TX from the menu bar.

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

For these and other general operation techniques see the General Operation Topic.
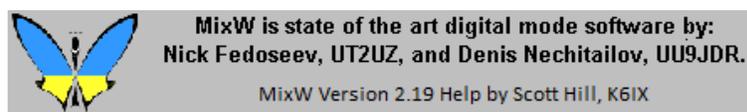
MixW: MFSK Image Mode
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Sending Pictures in MFSK:

While operating in the MFSK mode it is possible to switch to a narrow bandwith image mode and send small pictures without the operators manually changing from the MFSK mode at either the sending or receiving station.

The pictures should be small, no larger than about 250 x 200 pixles. The operation is much easier if the picture is put in the MixW folder, but that is not required.

The sending station should inform the receiving station that a picture is about to be sent. Then the sending operator should select File | Send Picture and then choose B/W... or Color.... The following dialog box will open.

NOTE: B/W or Color applies only to the transmission method. Choosing B/W will result in a shorter transmission time than if the same picture is sent in Color.

Find and select the picture you want to send (.bmp or .jpg) and click open to start the transmission of the picture.

An icon appears in both the RX and TX windows of the sender's MixW screen while the picture is being sent. Note: If an "X" appears across the icon it means that MixW could not open the picture file because of the file type or because the file is damaged.

At the receiving station the same icon will be shown in the RX window, and the picture will be displayed in the upper left corner of the screen.

When transmission is complete the receiving operator can click on the Microsoft Icon in the upper left corner of the received picture, then select Save Picture..., and then select a location to save it.

On both stations MixW will switch back to the MFSK mode.
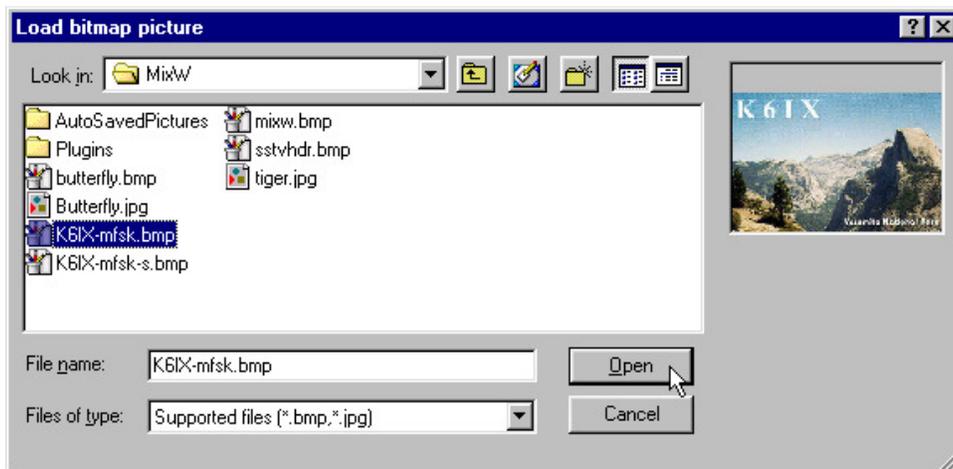
Using macros to send MFSK pictures.
There are three macro commands that can be used for sending pictures in MFSK:

<PIC?N> - same as selecting File | Send Picture... | B/W...
opens dialog box to select picture file, sends in black and white
<PIC?N%C> - same as selecting File | Send Picture... | Color
opens dialog box to select picture file, sends in color
<PIC:filename.ext%2000> - sends picture file in high resolution black and white

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

MixW: THROB

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THROB Introduction and Theory

THROB Operation

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Using macros to send MFSK pictures.
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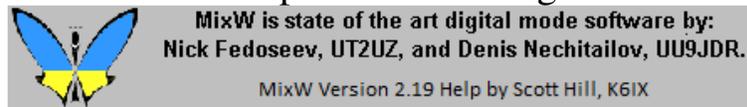
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opens dialog box to select picture file, sends in black and white
<PIC?N%C> - same as selecting File | Send Picture... | Color
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MixW: THROB Intro and Theory
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This page contains excerpts from the author of the THROB program, G3PPT, from his website at: http://www.lsear.freeserve.co.uk/page3.html.

THROB, An experimental program using 9 tones and FFT detection

The Fast Fourier Transform Waterfall Display allows the display of signals that can barely be heard and this prompts ideas for harnessing the FFT waterfall display for communication purposes. An obvious example is slow CW whereby the dots and dashes are decoded visually, another is multi-tone Hell whereby different tones make up the dot matrix of characters and are sent simultaneously (MT Hell), or sequentially (SMT Hell). The author has

developed a program called SLOWFELD, (available elsewhere on this site), which is essentially very slow speed Hellschreiber whereby the intensity of selected FFT bins is plotted. This is very effective but very slow at 2 chars/minute and like all the Hell methods, suffers from the disadvantage that the whole character has to be sent as a "picture" and there is no ciphering advantage of 'E' over 'Z' for instance.

The amateur fraternity has an enormous choice of methods for two-way QSO's taking place under normal conditions such as PSK31 and Hellschreiber and their developments. The THROB program is an attempt to push DSP into the area where other methods fail because of sensitivity or propagation difficulties and at the same time work at a reasonable speed.

At the outset, please be aware that this is at an early state of development and may change a great deal, or come to nothing at all.

The program uses a Pentium based PC equipped with Windows95 and a soundcard. The soundcard runs at 8000Hz and uses data blocks of 2048, 4096 or 8192 16 bit samples. for the three speeds of 4, 2 and 1 baud respectively. Pairs or single tones out of a palette of 9 in a 72 or 144Hz bandwidth are sent and received sequentially, each tone being 2048, 4096 or 8192 samples long and shaped as a semi raised cosine "throb" in that the leading and trailing quarters of the block are raised cosine shaped. The permutations of single and pairs of tones out of a palette of 9 allow for a rudimentary character set to be sent in a single pulse. For reception, the 72 or 144Hz band pass (obtained via FFT and reverse FFT filtering) is positioned centrally over the signal, and then the presence and position of the tones is our unit of coding. Synchronization of the reception process to the incoming "throbs" is used, and can now be set automatically.

The program is a development of a previous version, which used 5 tones in a 40Hz bandwidth with the characters being coded into the permutations of three successive tones. This was slow at 7 words per minute and also sideband sensitive, however it did prove that amateurs had equipment and were able to use it to tune within 3 or 4 Hz and, with the aid of AFC, to hold it. The latest version of the program has three speeds: 1, 2 and 4 baud, allowing for a data rate of 10, 20 and 40 wpm respectively, and is not sideband sensitive in that both LSB and USB possibilities are decoded and displayed separately with the nonsense version being ignored.
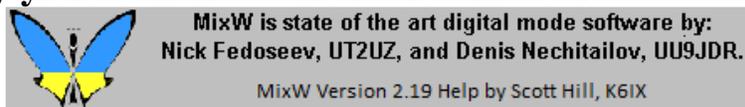
Auto synchronization has now been added whereby the program looks for two consecutive minima in the received signal intensity, the correct time apart and then sets the commencement of sampling at the first one.

AFC is available wich can cope with a drift of 1Hz in 5 seconds or so.

There are still possibilities for improvement and fine-tuning of the program.

Since this work started it has become part of a general move towards trying MFSK modes on the amateur bands, MFSK having been neglected in the past. Murray, ZL1BPU has formulated a tentative specification for an amateur form of Piccolo and Nino, IZ8BLY with Murray has made enormous advances in this direction with a program called STREAM which is now available with several modes. Nino has been able to incorporate error correction into his program. I cannot do this with my current number of tones.

One way or another, this looks to be an interesting area of development that should ultimately yield benefit to the radio amateur.

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

<p style="text-align:center">MixW: THROB Operation</p>

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THROB is a narrow band mode, although not as narrow as PSK31. Your transceiver's set up should be essentially the same as used for PSK31. See PSK31 Operation to review those recommendations.

Perhaps the first thing you will notice when tuning in THROB signals is the distinctive throbbing nature of the sound, and the next thing is that Throb is very slow compared with most of the other digital modes.

Select the THROB mode with Mode | THROB, or by clicking on the Mode box in the Status Bar and selecting THROB. Then select Mode | Mode settings. This will bring up the following dialog box:
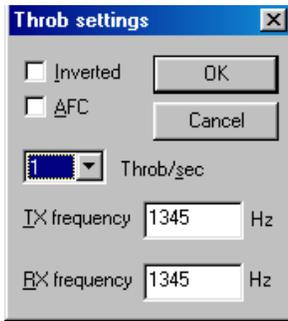
The TX and RX frequencies show the location of your cursor is in the spectrum window. A setting of around 1500 Hz is recommended, which keeps your transceiver operating close to the center of its pass band. THROB rate is selectable (if you don't see what you want in the drop down box, any number can be typed in).,

AFCcan be **on** to assist in tuning the THROB signals.

Inverted when clicked will invert the positions of the frequencies. This can be used if you are operating on the opposite sideband from the station you are trying to copy. If you appear to be tuned into a strong signal and are only copying garbage, try clicking **Mode | Inverted, or clicking the box in the Throb settings.** You may find the station start to print 100 percent as a result. See Inversion in the Configuration Section.

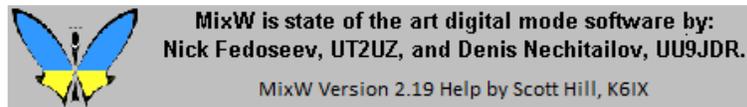Here is a screen shot of a Throb signal on the waterfall display:
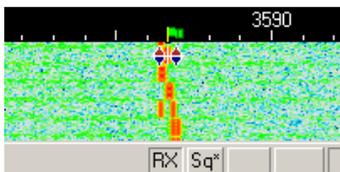
As you can see Throb uses the two diamonds with a bar between., and that they are substantially closer together than any of these other modes.

Receiving Throb
Tune in a Throb signal by pointing right in the center of the tracks with the mouse and clicking the left mouse button. The text being sent by the station will then appear in the Receive Window. The diamonds will move together to track and tune Throb QSOs.
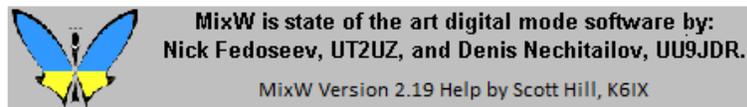
Transmitting Throb

To transmit to a station, first tune it in as indicated above. Type outgoing text in the Transmit Window. Press 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 (or one of the other toggles) again. Pressing ESC will abort transmission and return MixW to receive mode, but the last several characters typed will not be transmitted.

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.
MixW Version 2.19 Help by Scott Hill, K6IX

MixW: FSK
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FSK Theory and Operation

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.
MixW Version 2.19 Help by Scott Hill, K6IX

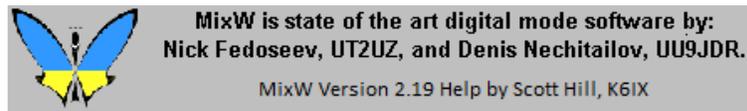## MixW: FSK31 Theory and Operation
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The main difference between FSK31 and PSK31 is that FSK31 represents a 90/270 degree phase shift (DBPSK) instead of the 0/180 pair used in the original BPSK31 by G3PLX.

FSK31 is not as vulnerable to over modulation as PSK31. FSK31 is Nick's solution to cleaning up the QRM caused by careless over modulation of PSK31 signals. Here is a comparison of PSK31and FSK31 using a spectrum bandwidth at the -40 db level:

		PSK31	FSK31
Clean Signal:	Idle	31	31
	Random	80	60
Light Distortion:	Idle	220	124
	Random	220	93
Heavy Distortion:	Idle	500+	160
	Random	500+	93

Random = random sequence of characters.

Operating FSK31 is essentially the same as operating PSK31

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MixW Version 2.19 Help by Scott Hill, K6IX

MixW: MT63

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MT63 Introduction and Theory

MT63 Operation

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Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.
MixW Version 2.19 Help by Scott Hill, K6IX
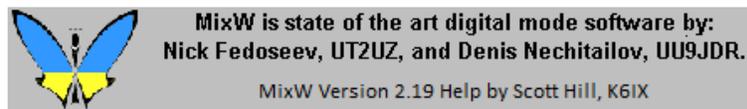
MixW: MT63 Intro and Theory

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By Murray Greenman, ZL1BPU

MT63 is a DSP based advanced HF mode for Amateur Radio, intended to provide high performance keyboard - to - keyboard conversational operation on HF bands under poor conditions. MT63 utilizes a number of revolutionary ideas, and is technically very complex. MT63 is no more difficult to operate than RTTY, and can be easy to tune. It also provides much better performance on HF than most other modes. The specialty of MT63 is its performance when conditions are both weak and unstable.

Simple Description
By encoding the data to transmit (what you type on the keyboard) in a complex way, using 64 different modulated tones, the MT63 developer Pawel Jalocha, SP9VRC, has been able to include a large amount of extra data in the transmission of each character, so that the receiving equipment can work out, without any doubt, which character was sent, even if 25% of the character is obliterated. This technique is called Forward Error Correction. Other modes use FEC (for example AMTOR mode B uses a simple FEC technique), but MT63 has other advantages. Unlike most HF modes where a character can be lost or changed into something

else by a single noise burst, MT63 is inherently very robust, because each character is spread over many tones (to avoid interference such as other radio transmissions) and over several seconds (to avoid bursts of noise, such as lightning). On each tone, the transmission data rate is also fairly slow, which suits the nature of ionospheric disturbances. Despite the low data rate, good text speed is maintained because the text is sent on many tones at once. The system runs at several different speeds, which can be chosen to suit conditions, but 100 WPM, much faster than you can type, is typical.

MT63 sounds unusual, (it sounds like a roaring noise) but the performance is spectacular. There is no connection process, as in AMTOR, Packet or PACTOR. Some users maintain that under poor propagation conditions (excessive fading) MT63 works better than either PACTOR II or Clover. Under good conditions the performance advantages are less obvious. The convenience advantages remain, no matter how good the signal - the mode is suited to nets and random QSOs, as no link need be established. MT63 is also far more immune to interference and deliberate jamming than any of the more conventional modes. Changeover from transmit to receive and vice-versa is slower than most modes.

There are disadvantages to MT63. First, the mode is broad (see below) and quite aggressive, i.e. it causes interference to other modes, but itself is little affected by other modes. Also, because of the delay through the error correction and interleaving processes, it is not possible have quick turnaround "slick" QSOs. In other words, operation is clumsy.

About Wide Modes
Modes like MT63 are quite different from the traditional Amateur digital modes, in fact even other new digital modes. MT63 is both wideband and relatively slow, gaining performance enhancement by spreading the signal in time and space, although it is not a "spread spectrum" mode. There is some controversy surrounding indiscriminate use of modes such as MT63, because they appear to generate wider signals for a given data rate than other modes. Choose your operating times and frequencies with care! (In other words, 20 meters when the band is open and crowded is not appropriate).


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MixW Version 2.19 Help by Scott Hill, K6IX

MixW: MT63 Operation
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For MT63, you must tune with your transceiver's VFO . The tuning indicators cannot be changed with the mouse. Their location can be changed, however, by selecting Mode | Mode Settings, while in the MT63 Mode. This brings up the following dialog box:
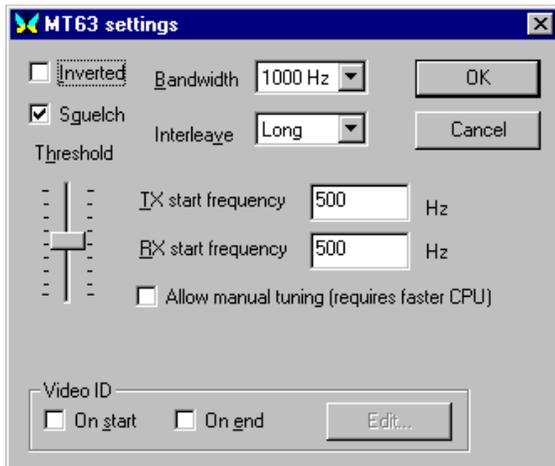
The TX and RX start frequencies determine the location of your tuning indicators on the waterfall display. These should be the same unless your intention is to operate "split", or your transceiver's TX and RX frequencies are out of alignment with each other and you want to compensate for that here.

Transceiver Settings

Fine Tuning: If your transceiver is equipped with a "FINE" tuning feature, always use that for MT63 tuning once you have found MT63 activity. Some older rigs are really not stable enough for PSK31 operation and will drift considerably off frequency, but because of the wider bandwidth, they are often fine for MT63.

Pre-Amp: This can be on or off depending on the operating conditions. It can help when working weaker stations in certain situations, but can also make things worse if there are strong adjacent signals.

USB: Almost all MT63 operators use USB transmissions. **Note:** While using the CAT features, MixW automatically adjusts tones depending on which sideband you are operating on. If you are not using CAT, MixW needs to know which sideband your operating on to set the inversion correctly. (See the discussion bellow under inversion).

Filtering: Optimum filtering depends on your transceiver's SSB filtering options and it's IF rejection characteristics, however MT63 is generally 1000Hz wide (MixW allows 500Hz and 2000Hz MT63 as well). This is much wider than the other digital modes, with the exception of FAX and SSTV. In general your SSB phone filtering will be the best choice for MT63 operations.

Power: This of course depends on conditions. MT63 uses a much wider bandwidth than the PSK31 modes, and so it will require higher power to deliver the same overall signal to the receiving station. Never use more power than you need to for any given situation.

MixW Settings
As mentioned above, the TX and RX start frequencies can be set to determine the location your cursor in the spectrum window. A location between 500Hz - 1500 Hz, will keep your transceiver operating close to the center of its pass band.

Bandwidth: Bandwidth is selectable as well. Most MT63 uses a bandwidth of 1000Hz.

Squelch and Threshold can be used and adjusted to suite your operating preferences.

Interleave: Interleave must be adjusted according to bandwidth: try the following combinations:
Bandwidth Audio Range Interleave/char
500 Hz 500 - 1000 Hz Long
1000 Hz 500 - 1500 Hz Short
2000 Hz 500 - 2500 Hz Very Short

Use 8-bit encoding and Escape Char: Original MT63 supports only 7-bit encoding, which does not allow the use of international characters. 8 bit encoding allows an extension to MT63 protocol where each extended character (with code > 127) is represented as two 7-bit characters: the escape symbol and symbol code minus 128. To allow these charectors check the 8-bit encoding and set the Escape Charector to 127 (the defaulte value).

Video ID and options
This is an unusual feature used to transmit a Video ID, which is visible on the waterfall display. See SSTV for details on Video ID.

Inverted when clicked will invert the tones to match a station. If you appear to be tuned into a strong MT63 signal, which is tuned within your cursors, and are only copying garbage, try clicking **Mode | Inverted.** You will often find the station start to print 100 percent as a result. **Note:** This feature works differently in MixW than most other SoundCard digital programs, so please read and understand the information about inversion in the Configuration Topic.
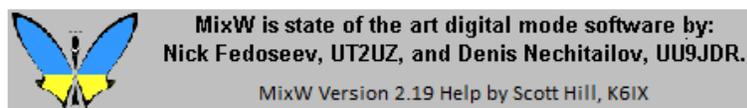
Receiving MT63

Tune your transceiver's VFO until the MT63 signal appears within the tuning indicators as shown here:
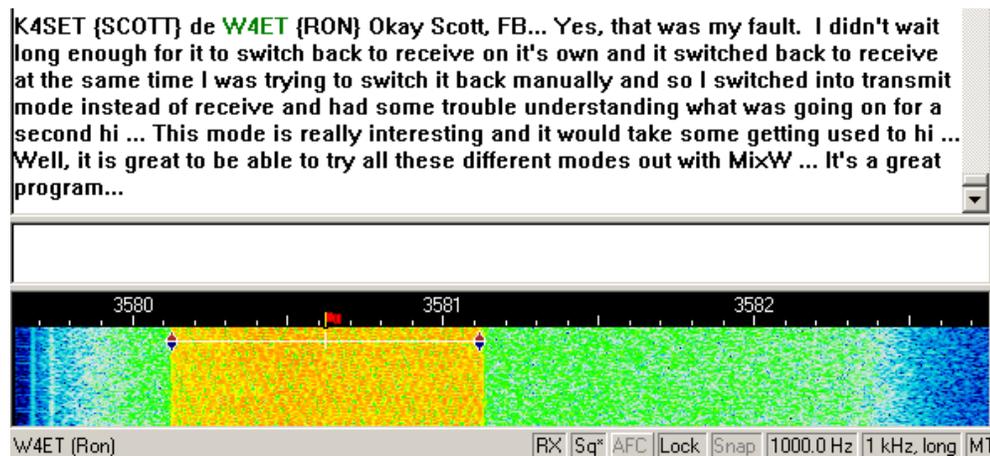
Text should decode and appear in the RX window. If the MT63 signals you're attempting to tune are too wide or too narrow to line up with your tuning cursors, you may need to change your bandwidth setting as described above.

Transmitting MT63

To transmit to a station, tune it in as indicated above and type your outgoing text in the Transmit Window. Press 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.

MixW is state of the art digital mode software by:
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MixW Version 2.19 Help by Scott Hill, K6IX

MixW: SSTV

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SSTV Introduction andTheory

SSTV Operation

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

MixW: SSTV Intro and Theory
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By Chuck Schied, Jr., W3OHV

SSTV is facsimile, and facsimile is a method of producing a picture a line-at-a-time. Newspapers and the wire press (e.g., AP, Reuters, UP) use facsimile for photos and text via wire and radio. Facsimile uses a line scanning system. More lines, hence more time taken to send them, creates sharper better-defined images. Line scanning is a very old concept. It is used in infrared mapping and military reconnaissance. Artists have used the concept to copy graphic images freehand. Ham Radio Video is a compromise system that runs fast enough to produce attractive -- sometimes very beautiful -- pictures.

Slow Scan pictures used in amateur radio can be sent in a variety of time formats. Simple black-and-white photos of low resolution can be sent in 8 1/2 seconds. Good quality pictures in B/W or Color can be sent in one to three minutes. Excellent pictures in Color can be sent in about four minutes. Standard resolution of a picture today is a 640 width x 480 height pixels with 24-Bit color. 24-Bit color (also known as Truecolor) is able to reproduce up 17 million different hues. These are minute variations of eight basic colors like red, yellow, green, blue, white, black, magenta, and cyan. Today's Slow Scan pictures using formats like Scottie #1 or Martin #1 are quite stunning! There are fifty or more formats created by many different programmers.
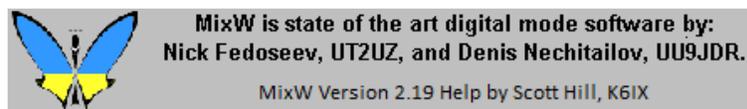
Slow Scan is actually faster than facsimile but slower than standard Television! You can use the longer formats like Scottie DX or WRASSE 180 (4-5 minutes) and receive beautiful pictures even in poor receiving conditions. You may have heard SSTV on 14.230-233 MHz or 7173 MHz. You can learn a lot by listening. Don't invest in Slow Scan until you have learned something about it from people who know what they are talking about. Newcomers have many erroneous ideas about the Mode and will be poor tutors. Old-timers who own ROBOTS are of little

help if they have not become expert users of PCs and use the SSTV PC Programs routinely.

Where Slow Scan Video is Today

About 1992-93, as the Personal Computer began to appear in ham shacks, Slow Scan was no longer an expensive, experimentalist, activity. Prior to that time an expensive converter built by ROBOT RESEARCH Company was the only way to receive and send Slow Scan. After several years of PC programs, written by radio amateurs who were also involved in programming, the mode increased in popularity as new and better PC performance became available, especially in CPU speed, better color, and sharper resolution.

For additional SSTV information vist: http://www.kiva.net/~djones/

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

MixW: SSTV Operation
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MixW and SSTV

Nick does not intend that MixW will compete with MMSSTV, ChromaPIX and other dedicated SSTV programs. It does not have extended services like templates or diagonal texts with gradient fill, however it does allow you to make occasional QSOs. It has the ability to manually correct for phase and slant. It lets you quickly type and place text over transmitted images. Macros can be used for frequently typed words. This mode in MixW is intended as a tool for experimenters, and for those who want to save time by not having to switch to a different program for SSTV operations..

Selecting SSTV from the mode menu or the status bar brings up the following window:
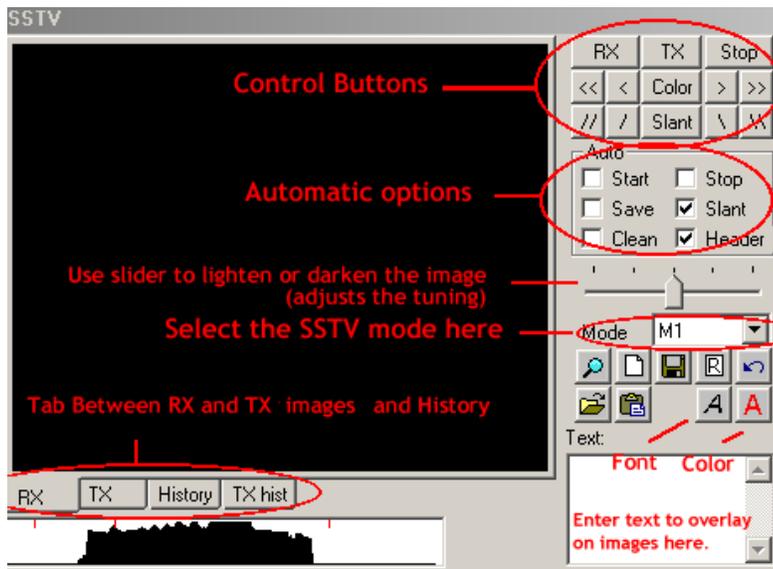
The control buttons are used as follows:

RX starts the receive image function using the mode selected.

TX will start the transmission of the image loaded into the TX window using the mode selected.

Stop will stop the RX or TX functions.

COLOR and horizontal location can be adjusted using the [<<], [<], [>], [>>] and the Color buttons.

Slant is adjusted using the [\,[\and Slant buttons.

You can also select which automatic options you want by using the Auto check boxes.

The RX, TX, History, and TX hist Tabs are used to select what is displayed in the image window.

To Load a TX image click the open folder icon and select the image from your files (the size should be 320x256x24).

To Save a RX image click the disk icon and select the location and name of the file to save.

To Load a picture from the clipboard, click the clipboard icon.

Text can be placed on the TX screen by selecting the text color and font using the indicated icons, then entering the text in the text window. Click the left mouse button in the TX window and move the text to where you want to place it, then release the mouse. The text can be placed during transmission.

The following screen shows a .BMP file that has been edited with text using the above procedure:

RX slant/phase correction:
Draw a line over the border of the picture. A left mouse click on the border corrects the phase only; the slant will not be changed. A right click can be used to move the picture up. The slant and phase can be corrected during receive.

Holding the Shift+slant keys saves the current slant correction, and this value will be used while transmitting or receiving the next pictures.

Modes
All the common SSTV modes are available for both TX and RX. Pull down the Mode text box for a complete list.

Header
By default MixW uses sstvhdr.bmp as a header. Edit this file if desired to change the header, or select another file by holding the Ctrl key and clicking the Load

icon. Hold shift during the load or clipboard operations to eliminate header. Just remove sstvhdr.bmp if you do not want any header.

Here is a tuned SSTV signal in the Waterfall display:
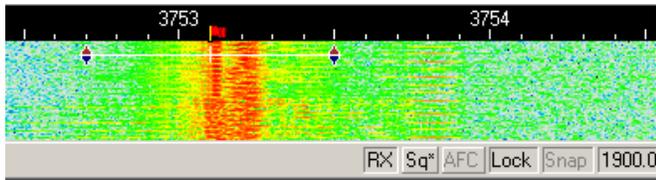
This yielded the following image from my friend Ron, W4ET:

SSTV Calibration using WWV
The WWV mode can be used to calibrate the soundcard while receiving WWV or RWM signals. RWM broadcasts from Moscow, and WWV broadcasts from Colorado and Hawaii in the USA. For more information check:

http://www.irkutsk.com/radio/tis.htm

http://tf.nist.gov/stations/iform.html

RWM time marks are transmitted on 4996, 9996, 14996 KHz. Tune your TRCVR to 4994.100, 9994.100, 14994.100 (USB). When the RWM signals are tuned:
Uncheck ALL Auto boxes
Select the WWV mode from the dropdown mode menu
Tune your receiver so the tuning indicator is on the signal as shown below.
Click on the RX button

You will see black and white bar patterns
Adjust the slant until the edges are straight
The image will depend on the timing intervals, but the edges should be straight in
any case. It should look something like this:
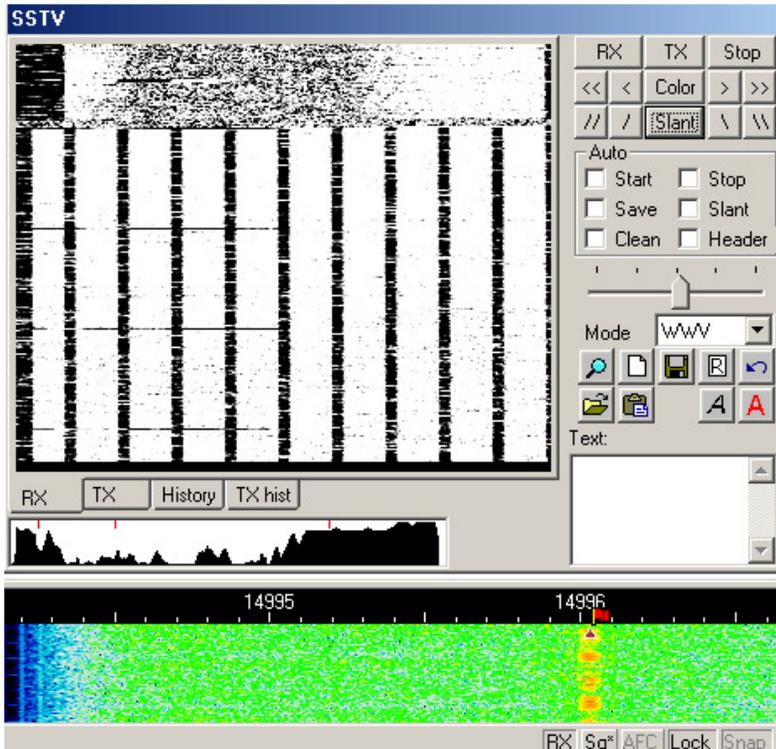
If you cannot find the time mark signals from RWM, tune about 1 khz above the
WWV signal (10001, 15001, or 20001 khz) and click on receive. You should get a
screen that looks something like this:
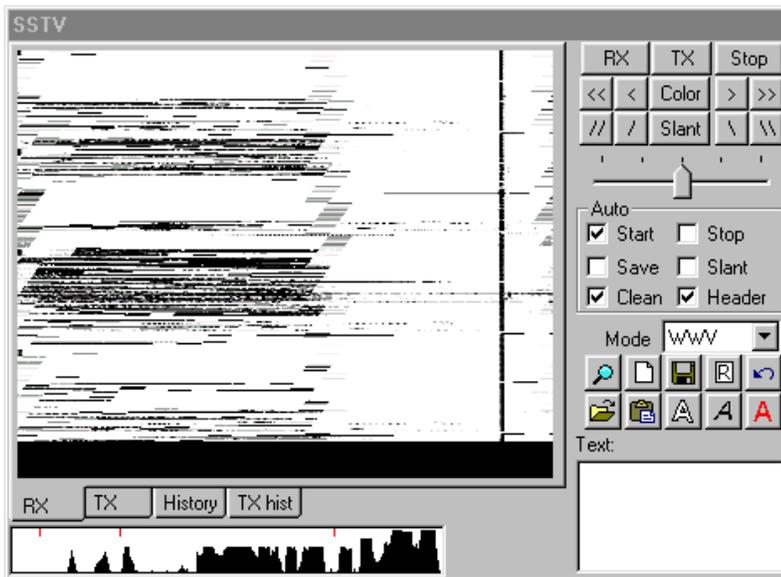
Adjust the slant as described above until the thin vertical line is parrallel with the edges of the window.

This SSTV slant correction can be moved to the soundcard sample rate correction to let other modes use that correction as well. To do this select the SSTV settings dialog from the Mode Menu and click on the "Go" button:
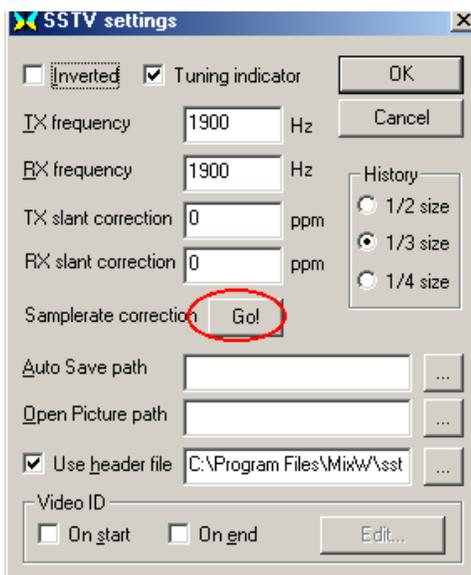
NOTE: The procedures described above will calibrate the soundcard for RX. Some soundcards have separate RX and TX corrections. To check your TX correction, start with the same correction you have calibrated for RX. Then send to a station with a soundcard calibrated for RX. If your transmitted pictures do not require slant correction by the receiving station your soundcard is corrected for TX. If your transmitted pictures do require slant correction you will need to experiment with changes to the TX slant correction (in the SSTV settings dialog) until they are correct.

SSTV Settings

You can also select other SSTV options from above dialog.

The Tuning indicator check box toggles the SSTV tuning display at the bottom of the SSTV window.

The TX and RX frequency settings locates your tuning indicator on the waterfall display and your radio's pass band. These cannot be moved with a mouse click on the waterfall display, but must be set here.

TX and RX slant correction are best left to the WWV calibration process, which automatically enters the correction here.

**The GO button** sends these corrections to the soundcard sample rate correction settings.

Selecting the history size determines how many images can fit in your History Tabs.

Setting the Auto Save and Open Picture paths will make saving and loading images much faster and more convenient.

Check the use header box if you want a header added to each TX image, and select the image you want to ad.

Video ID

This is an unusual feature used to transmit a Video ID, which is visible on the waterfall display as follows:
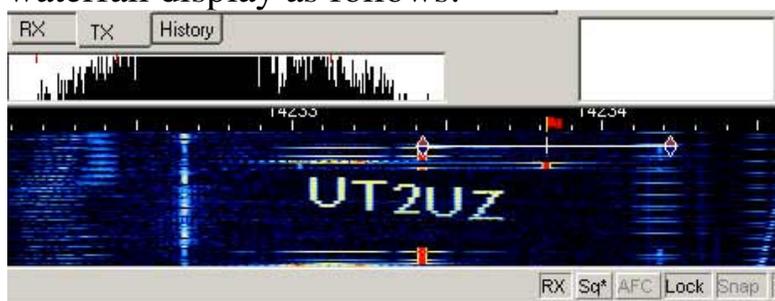
A simple editor is included. Since the power is divided by all points and transmitted at the same time, do not make long horizontal lines. Try the VID samples butterfly.bmp and mixw.bmp, which are located in the MixW directory, or

make your own. Select when to transmit your video (start, end, or both) and than click the Edit button, which will bring up the following dialog:

I made this VID by first loading the butterfly.bmp, and then clicking on the pixels to add my callsign to it. I then saved this to a new file and selected it as my VID.

Troubleshooting SSTV
In case of trouble with dropping receive or transmit, the following hints may help.
 Play with following lines in the mixw2.ini:
- Section
[Device 0 Setup]
m_iBufRxNum=48
m_iBufRxSize=256
m_iBufTxNum=48
m_iBufTxSize=256
declares 48 buffers, 256 bytes each to use for sound operations. If we use sound card at 11025 sps, total length equals to 48*256/11025 ~ 1.1 sec. I.e. a little less that a second is reserved for unexpected Windows delays. We can increase the time by enlarging buffer sizes or increasing the number of buffers. Increasing the buffer size in parallel with decreasing the number of buffers may reduce system load a little:
m_iBufRxNum=24
m_iBufRxSize=512
m_iBufTxNum=24

m_iBufTxSize=512
- Changing the task priority. Look for following section in the
MixW2.ini:
[Priority]
MainThread=0
Class=32
These values are by default, defining standard priority.
Try
Class=128 (HIGH PRIORITY)
or
Class=256 (REALTIME PRIORITY)
This will definitely help in multitasking environment, and let you
work with other programs at the same time, but it may hang slow PC.
Also you may play with increasing the main thread priority:
MainThread=1
or
MainThread=2
or
MainThread=15
I could set
Class=256 (REALTIME PRIORITY) and MainThread=15 on my C366 under
W2000 and both SSTV TX and RX worked great while I was opening PhotoShop,
compiled next update etc.
Also you may play with following numbers in [SSTV] section of MixW2.ini
FilterLength=4 May be increased. I use the value of 64 on my C366.
This value defines the number of taps used for the
FOR filter (actually the number of taps is FilterLength*2+1).
Dec=5 Decimation rate. May be decreased to 4 or 3.
I do not recommend to set it less than 3.

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Hellschreiber

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Hellschreiber Introduction and Theory

Hellschreiber Operation

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX
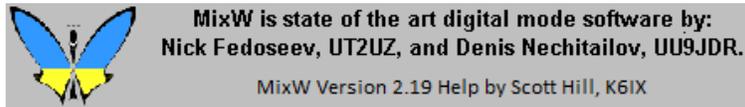
MixW: Hellschreiber Intro and Theory
_____

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.
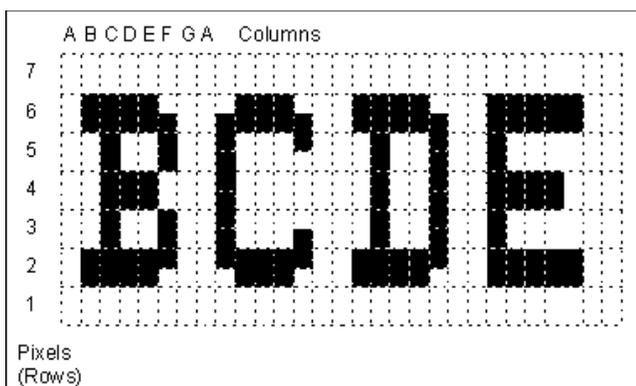
In this picture, the dotted rectangles depict individual dot locations in the matrix. There are blank, untransmitted picture elements (pixels) at the top and bottom of each character, and between characters. These are depicted as empty white rectangles. The transmitted (key down) pixels are shown black. 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 1/8.163ms = 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.
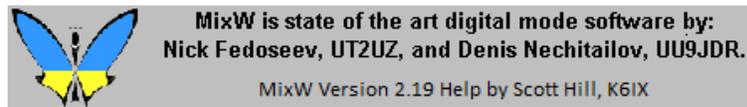
The output of the wartime Feld-Hell machine was a 900 Hz keyed audio tone, sent on a telephone line or to a transmitter modulator, for example an MCW transmitter. It was possible in some models to separate the keying contacts for direct keying of a CW transmitter. Feld-Hell is therefore amplitude keyed, 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 Radcomm, 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 Fuzzy 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.


MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Hellschreiber Operation
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Hellschreiber is a unique mode. Some would argue that is 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 by selecting Mode | Hellschreiber, or by clicking on the Mode box in the Status Bar and selecting Hellschreiber. Next bring up the mode settings by selecting Mode | Mode settings. This will bring up the following dialog box:
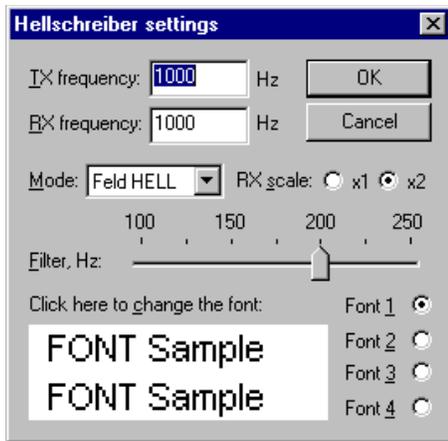
The TX and RX frequencies show the location of your cursor is in the spectrum window. The best frequency is around 1500 Hz, which keeps your transceiver operating close to the center of its pass band.

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

RX scale: Setting the RX scale to x2 may help you decipher hard to read characters, but you will not be able to see as much text on each screen. Use x1 unless your having trouble seeing the text at this resolution.

Font Selection; You can pre-select up to 4 different fonts by clicking the button next to each font # and then clicking in the font sample window. **This is the font you are transmitting, not receiving.** You will receive the font selected by the sending station.
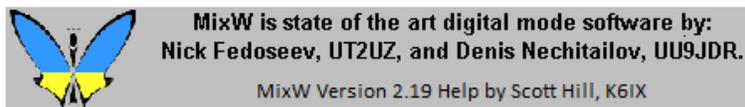
Here is a screen shot of a Hellschreiber QSO:
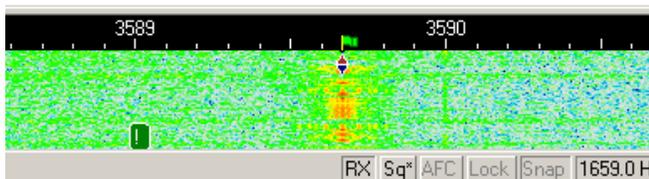
As you can see Hellschreiber uses the single diamond indicator like PSK31 uses, and the bandwidth is very narrow. Received text appears in double or triple lines. You can see more text on your screen by removing the log and other tool bars from the display.

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.
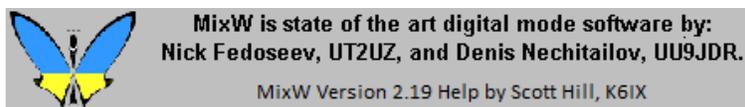
Transmitting Hellschreiber

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.

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.
MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Olivia

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Introduction to Olivia Operations

MixW is state of the art digital mode software by:
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MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Introduction to Olivia Operations

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Olivia.

Olivia was designed and first implemented by Pawel Jalocha, SP9VRC. You can see Pawel's discussion of the development and characteristics of the Olivia mode at:

http://homepage.sunrise.ch/mysunrise/jalocha/mfsk.html

and the draft specification for the Olivia HF transmission system can be seen at:

http://homepage.sunrise.ch/mysunrise/jalocha/mfsk_spec.html

Implementing Olivia in MixW.

Effective with version 2.16 MixW has a capability for "External mode plugin support". This allows new modes to be added to MixW without modification to the main MixW program. Olivia was the first mode implemented using this plugin support. In order to use Olivia in MixW 2.16 or later the file named ModeOlivia.dll must be in the MixW program folder. The ModeOlivia.dll file can be downloaded from Nick's web site at http://mixw.net.

Operating Olivia in MixW.

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. After installing the ModeOlivia.dll file in your MixW program folder, restart MixW and select Mode | Olivia, then Mode | Mode Settings. You will see the following dialog box:
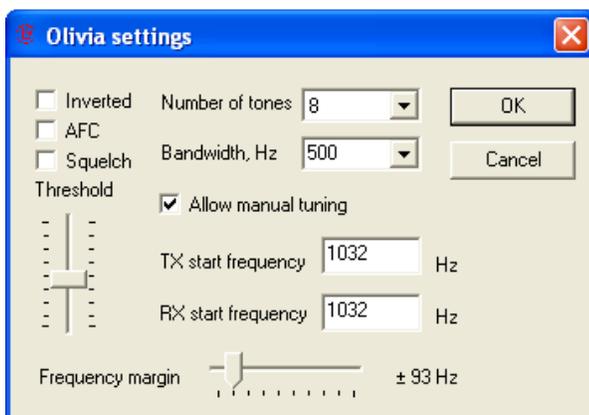
Be sure to check the "Allow manual tuning" box which will allow you to set the center frequency of the Olivia signal by clicking in the waterfall or spectrum.

The "Number of tones" can be selected from 8 different settings between 2 and 256, and the "Bandwidth, Hz" can be selected from 5 different settings between 125 to 200.

In practice, the normally used combinations are:

500 Hz, 8 Tones:.....

500 Hz, 16 Tones:....

1000 Hz, 16 Tones:...

1000 Hz, 32 Tones:...
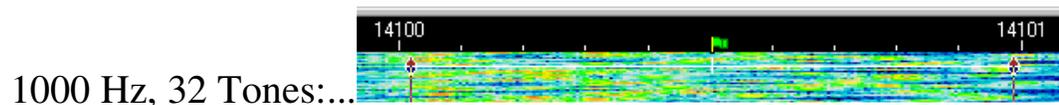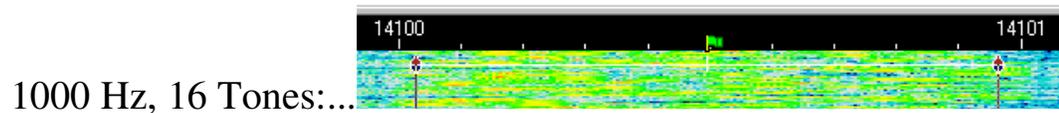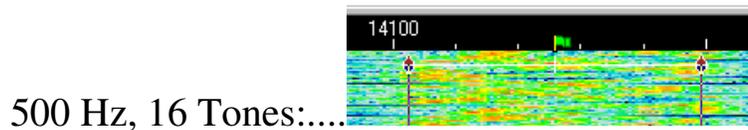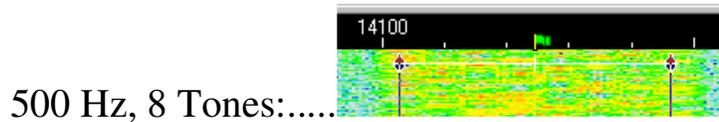
As with all digital modes, after a little experience the user will be able to identify the various formats visually in the waterfall.

Finding and Tuning Olivia Signals.

As of this writing (April 2006) there remains a great deal of dispute about where and how Olivia should be used. The early (pre MixW) versions of Olivia were set to operate only on fixed audio frequencies and many users continue to use those fixed settings. With MixW, however, Olivia can be operated exactly like any of the other MFSK modes, by clicking the desired center frequency on the waterfall or spectrum display.

Frequencies currently being used for Olivia seem to be:

40 meters, 7035-7038 & 7072-7074
30 meters, 10134-10139
20 meters, 14075-14078 & 14100-14112

The best combination for calling CQ is probably 500 Hz, 8 Tones. 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.

MixW is state of the art digital mode software by:
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MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Appendices
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MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Contest Operation
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MixW offers extensive support for contest operation, including special Macros, as well as special logging features. It can be configured for specific contests, and these settings can be stored for future use.

The full list of configured contests is shown in the List of Contests dialog from the View | Contest Mode. This brings up the List of Contests menu. You may edit, delete, or add new contest settings from this dialog. The "Select" button sets the active contest from the list of contests. Specific DLL files for many contests are also available from Nick's website. When downloaded and installed in the Plugins subdirectory, these DLLs will keep track of your statistics for that contest, as well as enable MixW to automatically calculate your scores for inclusion in your electronic log submission.

The contest mode is turned on or off from the View | Contest Mode menu. While In the contest mode, the Log Bar can be set to display exchange numbers instead of the name and QTH fields. To do this select View | Log bar | Contest layout.

The contest mode also allows you to check for previous QSOs made during the current contest only.

Configuring MixW's contest mode.
For contest operation, first switch to the contest mode by selecting View | Contest Mode. This will bring up the following contest selection dialog:

Select the active contest by highlighting it and pressing the Select button. From here you can also add a new contest, edit an existing contest, or change the active contest. (Selecting none returns MixW to the regular "non-contest" mode) To edit a contest, highlight it and select edit. To add a contest, click on the add button. Either of these options will bring up the following edit contest dialog box:

Here you can configure the logging features to suite the times and rules of the specific contest you are operating, and these settings can be saved and recalled for the next time you operate this contest (or a similar one).

Name - This is the name of contest, which appears at the top of MixW window when the contest mode is active.

Your call - specify the call sign you want to use in this contest. All QSOs during the contest will be logged with this call.

NRS is the report you send. If it is a serial number, enter the number you want MixW to start with, and check the AutoInc box if you want MixW to automatically increment these numbers in your Macros and log.
Note: I found I had to check the AutoInc box, and then enter the first number manually in log bar to get this feature to work. If this specific contest requires a different type report, that can either be entered here, and simply leave AutoInc unchecked, or that can be added as text in your contest Macros.

Start is the start time of the contest.

End is the end time of the contest.
Note: Keeping track of the start and stop times enables MixW to know which QSOs count in the scoring and dupe checking.

If **AutoInc** is on, MixW automatically increments the number in the ExchSnt field of the previous QSO. If the previous QSOs has no number (such as at the very beginning of the contest) the number 001 is used.

If **AutoInc** is off, the **ExchSnt** field is just copied from the previous QSO. (The **NR sent** field from the Contest Settings dialog box is used at the beginning of the contest.)

The ExchSnt for the current QSO can be changed by typing another text in the pop up box that is displayed during the QSO.
.
Auto Grab - this feature allows auto-grabbing of serial numbers, time (such as for the BARTG contest) and states/counties/cantons/etc. from received data.

When the Auto Grab Serial number box is checked, MixW looks for strings that are likely to be a serial number and places them in the ExchRcv (exchange received) field of for the current QSO.

When the Auto Grab Time box is checked, MixW looks for time stamps like 2317 or 23:17 or 2317z or 23:17z, and places them in the Notes field. (This only works if the time does is not much different from the local computer's GMT time.)

When the other Auto Grab boxes are checked, MixW looks for a limited set of strings, which coincide with that type of data. Domains can also be checked and a .dom file (located in the Plugins directory) can be specified to determine where to place the data received. For instance:
A RUSSIAN.DOM file contains a list of Russian oblasts to grab automatically:
------------- start of file -------------
Ab = AB
Ad = AD
Al = AL
.....
(102 lines with oblast definitions)
------------- end of file -------------
Now both the received serial number and a grabbed domain are put to ExchRcv field of the log file.
DOM files use a simple data format compatible with N6TR software:
Each line consists of the left part, equal sign, and the right part. Lines without equal signs are ignored as comments.
The Left part is a domain name,
The Right part is a list of words to grab.
Samples:
Ab = AB
Cd = EF, GH
Ij = JKL, MNO, PQ, R

A DOM file can be specified for each contest with domains that you expect to encounter in that contest.

Statistics
First you must download the specific contest DLLs available from the following sites:

Nick's Site: http://www.mixw.net/

Select the Contests page from the frame on the left of the home page. There are over 20 contests listed.

Jim Jaffe also maintains a collection of contest DLLs, which can be downloaded from: http://mysite.verizon.net/jaffejim/

Once downloaded these files should be unziped into the Plugins directory, which is in the MixW folder. Next they are selected in the Contest dialog by clicking on the Statistics browse button:
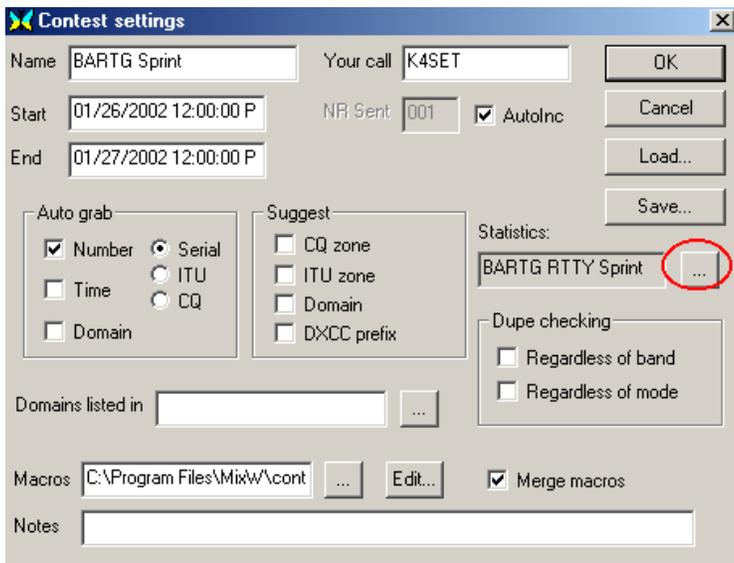
This brings up the following dialog:
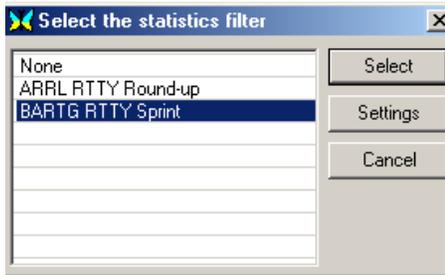
This is a list of available contest DLLs found in your Plugin directory. Simply highlight the desired contest DLL you wish to use for this contest and press the Select button. Some contests also offer settings options, which can be accessed from this menu as well.

With these DLLs installed and selected you can click View | Statistics - Show contest statistics, which will allow you to see your statistics as you work the contest in the following box:
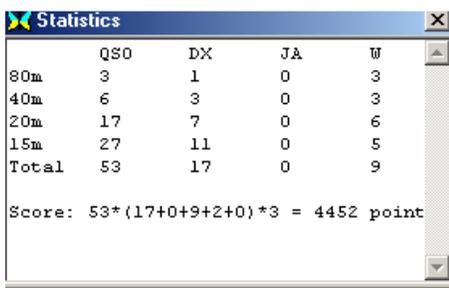
It's fun to watch your progress here as you work the contest. You can also view the Brief Log Statistics box for a more detailed view of your progress by selecting View | Statistics | Brief log statistics, which will display the following view of your progress:

```
Viewer                                                                              x
Print

Statistics for K4SET, contest: BARTG Sprint

Callsigns:
Band  Total CW    SSB   DIGI  RTTY  PSK31 SSTV  WPX
80m   3     0     0     3     3     0     0     3
40m   6     0     0     6     6     0     0     6
20m   17    0     0     17    17    0     0     17
15m   27    0     0     27    27    0     0     24
Total 49    0     0     49    49    0     0     42

DXCC WKD/CFM:
Band  Total CW    SSB   DIGI  RTTY  PSK31 SSTV
80m   1     0     0     1     1     0     0
40m   3     0     0     3     3     0     0
20m   7     0     0     7     7     0     0
15m   11    0     0     11    11    0     0
Total 17    0     0     17    17    0     0
```

Configuring the contest Macros

Macros - This is the name of file containing the individual keyboard macros for this contest (or blank space if no individual macros are used).

Merge Macros - if this check box is unchecked, macros from the specified file will be directly assigned to the Control Bar keys. If it is checked, the macros from the file will be merged with the macros for the current mode and/or the default MixW macros.

Notes This can contain any useful information describing this contest.

There are several special keyboard macros, which can be used in the contest mode:

<NRS> - sent exchange number
<NRR> - received exchange number
<CTIME> - contest time (BARTG contest) like "2317" (hours and minutes)
<ONQSOBEFORE:macro> - if we had QSO before, run specified macro.

Here are some example contest Macros, which will prove very helpful while using the contest mode:

If a station calls you that you have worked before in this contest (a dupe), this macro tells him you have worked before, and then clears the QSO information from the log.
Macro: F9
Label: QSOb4
Text: QSO before!<CLEARQSO><RXANDCLEAR>

Now, when you press F9, the other station sees the message "QSO before", and then the new QSO data is erased.

<ONQSOBEFORE:macro> can also be used (for example, inside the macro that answers someone's CQ) to automate the process:

Without automation:
Macro: F5
Label: Answer
Text: <TX><CALL> de <MYCALL> 599 <NRS> <NRS> <RXANDCLEAR>
He sees " AB1CDE de UU9JDR 599 001 001 ".

With automation:
Macro: F5

Label: Answer
Text: <TX><CALL> de <MYCALL> <ONQSOBEFORE:F9> 599 <NRS> <NRS>
<RXANDCLEAR>
In this case if you have not worked the station before they will see the above text. But if you have worked them before they will see " AB1CDE de UU9JDR QSO before! " and nothing more, because F9 macro with <RXANDCLEAR> at it's end and the "599 001 001" will not be sent.

You can configure Macros for a specific contest, but first you need to save the existing Macros to avoid loosing them and regretting it latter (ask me how I know about this!). Next, click on Save, and save the existing group as Basic. (You can skip this step if you have already saved the basic Macros). Now, let's load the generic contest Macros that come with MixW by selecting Configure | Edit Macros for this mode/group. This brings up the Edit Macro dialog box. Now you can load the default contest Macros that come with MixW by clicking on the Load button, then select the file "contest.mc". This will load the default Macros for contesting:
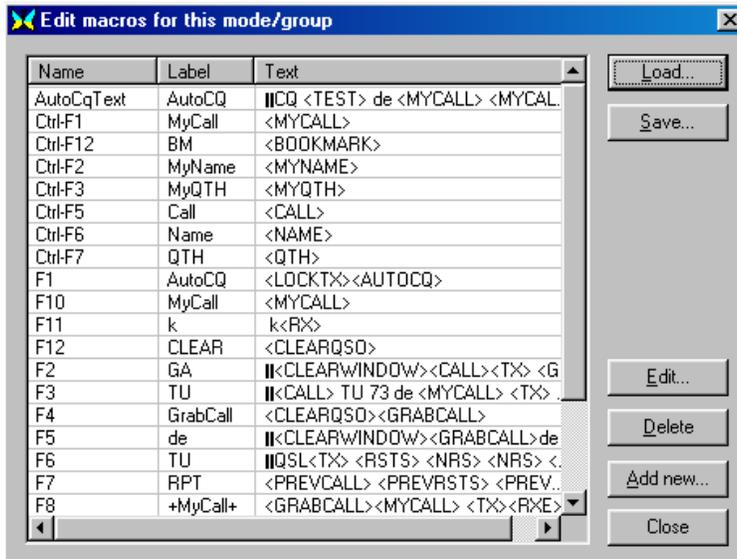
Now you can alter the Macros as you want them for this particular contest by double clicking on line (Macro) in this window, then edit them using the Edit Macro Window.

As an example of contest specific Macros here is a suggested set of Macros for the CCCC contest.

Set one is for calling CQ in a contest:
CQ: (To call CQ in the CCC contest)
<CLEAR><TX>CQ CQ CCC Test
CQ CQ Test de <MYCALL> <MYCALL> k<CR><LF><RX>

AutoCQ: (Assigns AutoCQ to the above Macro for this contest)
< ASAUTOCQ><CLEAR><TX>CQ CQ CCC Test
CQ CQ Test de <MYCALL> <MYCALL> k<CR><LF><RX>

QRZ: (To ask for another call when you haven't copied the station calling)
<CLEAR><TX>QRZ? AGN Pse de <MYCALL> k<CR><LF><RX>

ANSWER: (To answer a call with your report)
<TX><CALL> de <MYCALL> Hello, ur <RSTS>-<NRS>-<NRS> k<CR><LF><RX>

REPEAT: (To repeat your report)
<TX><CALL> Agn ur <RSTS>-<NRS>-<NRS> k<CR><LF><RX>

CFM: (Confirms and calls QRZ and saves the QSO to the log)
<TX><CALL> QSL 73 de <MYCALL> QRZ? k <CR><LF><SAVEQSO><RX>

NOCFM: (To ask for your report again)
<TX><CALL> PSE AGN UR REPORT de <MYCALL> k <CR><LF><RX>

These two Macros are for answering in a contest:
CALL S/P: (To call the station currently in <CALL>)
<TX><CALL> de <MYCALL> <MYCALL> k <CR><LF><RX>

CFM S/P: (To confirm, give your report, and save the QSO)
<TX><CALL> de <MYCALL> TNX, QSL, ur <RSTS>-<NRS>-<NRS> 73 de <MYCALL> k <CR><LF><SAVEQSO><RX>

Note: Replace <RSTS> with 599 if you do not want to see the prompt for your report for each QSO, and would prefer to always use 599.

These can be altered to work in almost any contest. When your finished editing your Macros for this contest, consider saving these to a new Macro file so you can use them next time by clicking on Save, and then calling something related to this contest.

The RUN, SEARCH AND POUNCE, and INTELIGENT (<INT>) macros.

There are several macros which are dependent on each other and the contents of certain fields in the contest log.

First, there are three macros to set the RUN or SEARCH AND POUNCE mode:

<SP1> sets search and pounce mode on.
<SP0> sets search and pounce mode off (run mode on).
<SP> switches between search and pounce and run mode.

Second, there is the <INT> macro which is called by default by the OnCR macro when MixW is in the contest mode. The output of the <INT> macro depends on the content of the CALL and RX EXCHANGE fields as shown in the following tables:

Search and Pounce Mode

Call	RX Exchange	..............Output..............	Macro to Edit
-empty-	-empty-	?	INTQRL
NEWCALL	-empty-	de mycall	INTDE
WKDCALL	-empty-	nothing	none
NEWCALL	exchange	QSL UR 599 001 (saves QSL)	INTQSL

Run Mode

Call	RX 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 (saves QSL)	INTQRZ

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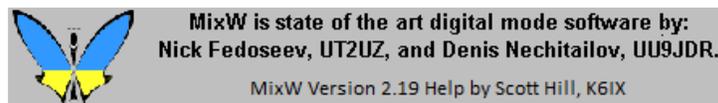
MixW: DX Cluster
_____

MixW has a built in DX Cluster window, which can obtain data from either a Packet or internet DX Cluster. To activate this window select View | DXCluster dialog. This brings up the following window:
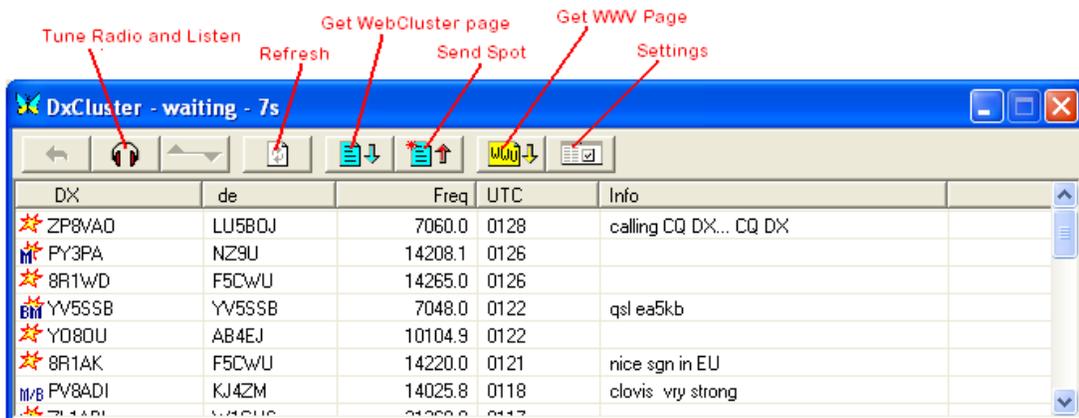
Internet based "WebCluster": Clicking on the "Settings" icon allows you to set the options for the DXCluster window. The options shown below are the default settings, which are for the DX Summit WebCluster. Another WebCluster can be substituted by filling in the appropriate server, port, and page information. DO NOT put a Telnet DXCluster URL in the WebCluster Server drop down lixt box.
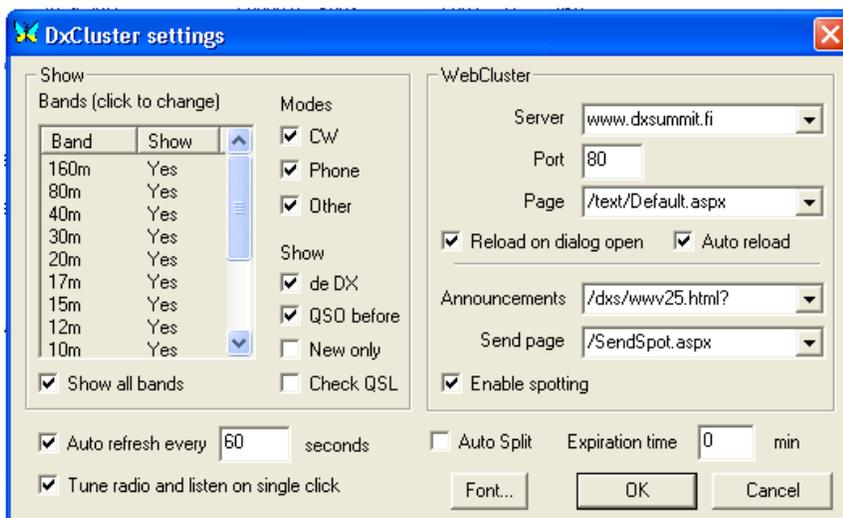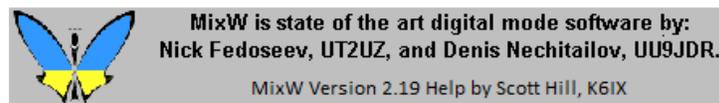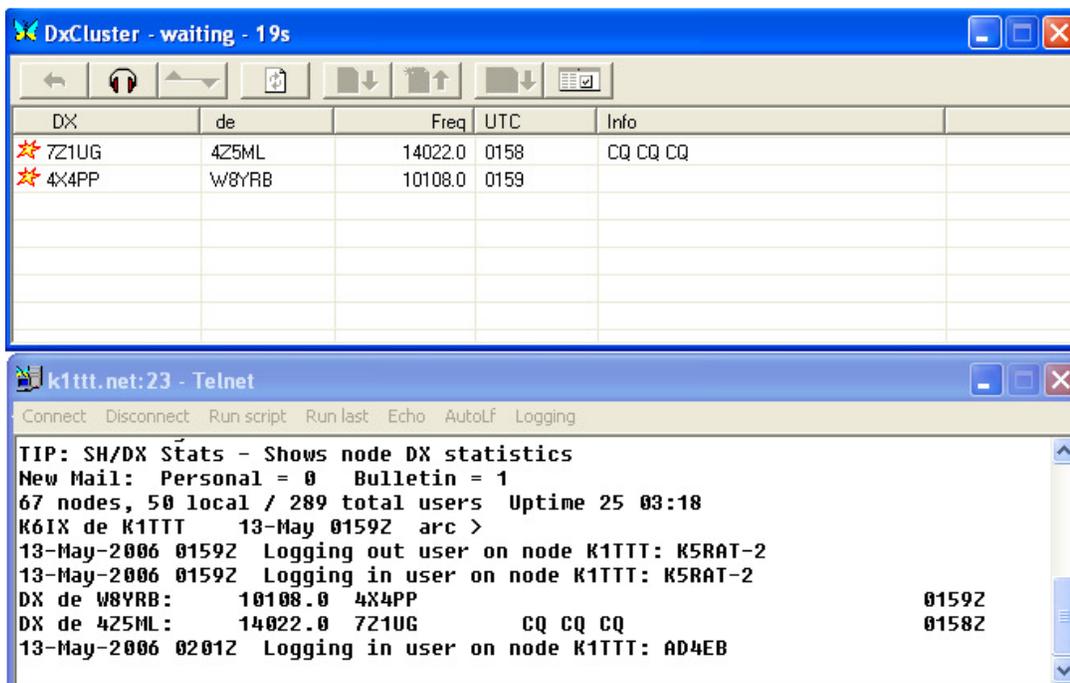

Packet based DXCluster: For the Packet DXCLuster to work you must have a packet TNC connected and configured. This is done by selecting Configure | TNC settings. You can also write a script file to connect your TNC to the packet DXCLuster. Then configure the Settings as shown for the Telnet based DXCluster below.

Telnet based DXcluster: You can use a Telnet DX cluster by telneting to the cluster and signing on manually using View | Telnet Window and clicking Connect. You can then use the Telnet Cluster in the Telnet window, or configure the MixW DX Cluster window. Using the MixW DX Cluster window will give you the advantages of a formatted display, and the ability to click on a spot and automatically QSY the radio (using CAT) to the location and mode of the DX. To configure the MixW DX Cluster window for a Telnet or Packet DXCluster, click on the Settings button and DELETE the entry in the server drop down box as shown below. Do NOT put the URL for a Telnet DX Cluster in the server box.
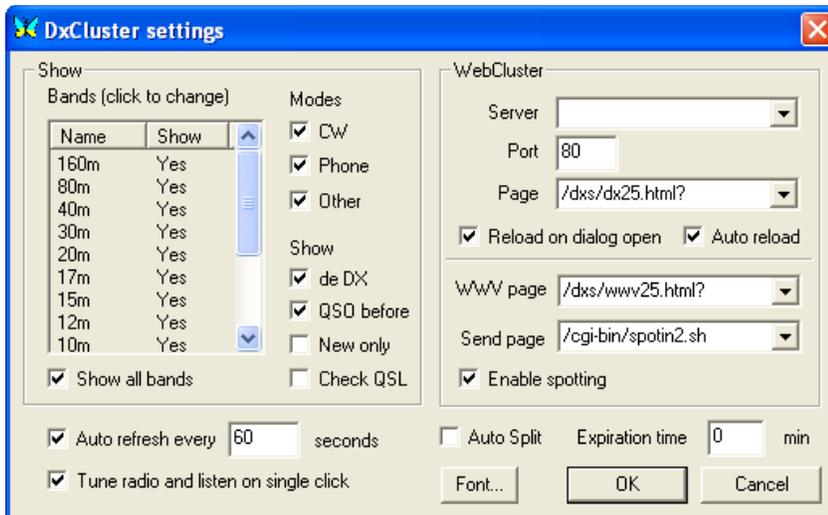
Click the OK button to close the Settings window and the MixW DX Cluster window will show "grey" buttons for the Get Web Cluster Page, Send Spot, and Get WWV Page buttons. The two windows below show the DX Cluster window and the Telnet windows displaying the same spots. You can then minimize either or both of the windows.

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MixW: FAQ's
_____

I have changed my call or lost my registration file.

- Send an email to the person you got your original registration file from giving them your old an new call signs.

My Menus do not look like the Menus in MixWHelp.

- MixW has two Menu Layouts. MixWHelp uses only Layout 1. Go to View | Menu and choose Layout 1.

I cannot find Olivia in my Modes Menu.

- Olivia is a "plug in mode". There must be a file named ModeOlivia.dll in your MixW program folder. If it is not there go to http://mixw.net/ and download it.

MixW will not transmit.

- Your callsign must be entered under Configure | Personal Data.
- TX/RX switching via VOX, RTS/DTR, or CAT must be properly configured.
- "DSP Filters" must be set to "none" under Configure | Soundcard Settings.

I can not get out of "Lock" mode.

- In CW: Go to Configure | TRCVR CAT/PTT and click "CW out via soundcard".
- In RTTY: Go to Configure | TRCVR CAT/PTT and click "AFSK in place of FSK".

I have totally goofed up my screen layout.

- In your MixW installation folder, rename the MixW2.ini file to OldMixW2.ini.
- Restart MixW and your screen configuration will be set back to the original format.
- When you get you screen layout set the way you like it, be sure to backup the MixW2.ini file.

Changes to my screen layout are lost when I quit MixW.

- In your MixW installation folder, right click on the MixW2.ini file then left click on Properties at the bottom of the pop up menu.
- At the bottom of the MixW2.ini Properties dialog are four attributes. Unclick all the boxes except Archive. Read-only must NOT have a checkmark.
- Click OK to close the dialog box. Now when you make screen layout changes in MixW the changes will be saved to the MixW2.ini file.

If I shut down MixW during a contest and start up later to continue with the contest I lose my sequence numbers and DUPE function:
When you restart MixW during a contest you must set the contest beginning date and time back to the original contest start time.

I don't understand how to calibrate my sound card.
In your MixW program folder there is a program named CheckSR.exe. Run CheckSR.exe and follow the built in instructions (help).

For very slow computers:

- Turn the tuning indicator off by selecting View | Tuning indicator (should be unchecked).
- Set the spectrum speed to Slow (under Configure | Soundcard settings).
- Set samplerate to 8000 (under Configure | Soundcard settings).
- Set DSP filter to none (under Configure | Soundcard settings).
- Reduce the height of waterfall. (Use the cursor)
- Turn off the average spectrum line (if not in the waterfall mode) (View | Spectrum | Average curve | None.

Waterfall seems to move too slow:
Set the Spectrum speed (Configure | Souncard settings) to a higher value (x4 is OK).

CAT interface doesn't work:
Refer to the interface manual and set the RST and DTR state properly (Configure | TRCVR CAT/PTT, and click on the Details

button). Several interfaces require RST=Always On and/or DTR=Always On. With these transceivers, the Hardware Flow Control does not work and should be unchecked.

It's very difficult to tune to MFSK16 signals:
Right-click at waterfall window and set Zoom to x2 or x3.

Name and QTH of non-US stations are not automatically filled from Radio Amateur Callbook (RAC) CD-ROM:
P.O. Box 2013, Lakewood, NJ 08701, USA - drop them a letter asking why they didn't make the non-USA records properly! But for now, In MixW you can use the drag-and-drop method to copy the name and QTH from the Callbook window.

Is there <RESYNC> macro for MT63?
Try to use <REPLAY> or <REPLAY:seconds>. It will resynchronize the receiver and also replay the sound history not to loose any information.

Is it possible to export selected QSOs?
Sure,
- select QSOs with mouse or cursor keys (Ctrl and Shift keys will help),
- export (or calculate statistics).

Is it possible to work PSK having another mode at second receiving channel?
Yes, right-click a second RX channel window, click Mode... and choose a new mode for this window.

For additional help and discussion on using MixW please subscribe to the MixW email reflector by following this link:
http://groups.yahoo.com/group/themixwgroup/

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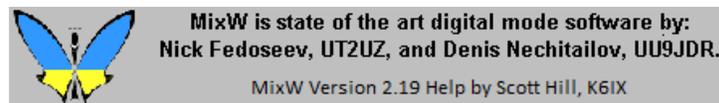
MixW: HF Digital Modes Band Plan
_____

General HF Digital Band Plan
There is little consensus right now on which modes are acceptable in certain portions of the digital mode sub-bands. The influx of new digital modes and operators is not welcome by some. Please make every effort to avoid interference with other modes.

To see the official band plans for all three IARU Regions see:

http://www.iaru-r2.org/hf_e.htm

The ARRL maintains "The Considerate Operator's Frequency Guide" for the United States at:

http://www.arrl.org/FandES/field/regulations/conop.html

In order to keep up with some of the current ideas you could join the email reflector at:

http://groups.yahoo.com/group/DigiMode_HF_Band_Plans/

Common Operating Frequencies for Specific Digital Modes
Specific frequencies for the digital modes change often as new modes are introduced, and general purpose lists are frequently out of date or incorrect. Your best bet is usually to search the Yahoo discussion groups for "digital radio" or the specific mode you are interested in. By joining the discussion groups and "reading the mail" for a few weeks you will usually see questions and answers about the best places to find a particular mode. A good place to start is:

http://groups.yahoo.com/group/digitalradio/

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MixW: Macro Commands

_____

The following Macro commands are available in MixW:

Text Macros

<MYCALL> - Returns your callsign as configured in Personal Data
<MYMAINCALL> - The same without /P, etc.
<MYNAME> - Returns your name as configured in Personal Data
<MYQTH> - Returns your QTH as configured in Personal Data
<MYWWLOC> - Your WW locater
<CALL> - Returns the callsign of other station as in log
<ACALL> - Allows call changing on the fly
<NAME> - Returns the name of the other station as in log. Returns "My Friend" if empty.
<OM> - Returns Text from Default Macros if Name in current log is empty (see example below).
<QTH> - Returns the QTH of the other station as in log
<WWLOC> - WW locator of other station
<NOTES> - Returns the Notes field as in the log.
<RSTR> - Returns received RST
<RSTS> - Returns sent RST
<NRS> - Exchange to send
<NRR> - Exchange received
<VER> - Inserts the MixW version number
<CWID> - Transmits CWID (as configured in Personal Data)
<CWID:text> - Set the CWID text
<CWID:DEFAULT> - Set default CWID from Personal Data dialog
<CR> - Sends Carriage Return symbol
<LF> - Sends Line Feed Symbol
<CRLF> - Sends both CR and LF symbols
<CTRL-x> - Sends Ctrl-A...Ctrl-Z symbol
<TAB> - Sends Tab Symbol (same as TAB key)
<[> and <]> - Transmits "<" and ">"
<SHOW:RIGEXPERTS> - lists connected RigExpert interfaces

Time related text Macros

<DATE> - Inserts the current date
<TIME> - Inserts the current time in UTC
<LOCALTIME> -Inserts the current local time
<STARTTIME>-Inserts the QSO start time
<FIXSTARTTIME> -sets the current time as the QSO start time
<CTIME>- time for the contest (HHMM format)

File Related text Macros

<FILE> - Inserts the contents of a file (selected by Send File Dialog box)
<FILE:filename> - Inserts the file indicated after the :
<TEXTFILE> - Opens dialog box to select the text file
<TEXTFILE:filename> - Inserts the indicated text file
<RANDOM:filename> - Inserts random string from a file. Designed to simulate live typing.
<INIFILE:file,section,name> -returns data from ini-file.
<INIFILE:friend.ini,[HI],<CALL>> -returns name from friend file (see example below).
<STARTRECORD2> - writes WAVe file from the second input channel
----

Condition Related text Macros

<GA> - returns GM, GA, or GE (based on the local time of the <CALL> station.
<GAL> -same as above but returns a long phrase (Good Morning, etc..)
<MODE> - prints the current mode
<MHZ> - prints the current frequency in MHz
<MHZn> - prints n digits after decimal point
<KHZ> - prints the current frequency in KHz
<KHZn> - prints n digits after decimal point
<QSONR> - This QSO number
<QSONR:MODE> - QSO number on this mode
<QSONR:BAND> - QSO number on this band
<AZ> Azimuth
<DIST> Distance (km)
<MILES> Distance (miles)
<WX?> - enter weather data
<WX> - returns weather data entered in <WX?>

Program Control Macros

<CURSOR:n> move cursor to field n in log (see example).
<CURSOR:TX> move cursor to the TX window.
<TX> - Starts transmission
<TXE> - Starts transmission after carrier loss
<RX> - Ends transmission
<TXTOGGLE> - Toggles between TX and RX
<RXANDCLEAR> - Switches to RX and clears transmit window.
<MODE:mode> - Sets new mode (for instance <MODE:RTTY> sets to RTTY
<MODEADD:mode> - Calls a defined additional mode outside of MixW.
<MODETNC:mode> - switches the TNC mode
<MODESETTINGS> - Brings up the mode settings dialog box for the active mode.
<MARKERS:xx,yy,...> - Up to 5 audio frequencies
<IMD> - works if IMD is fixed on the status bar
<BAUDRATE:rate> - Changes baud rate of PSK signals
<CURSOR:n> - places the input focus to the specified column number of the log bar
<CLEARWINDOW> - Clear current window
<CLEARTXWINDOW> - Clears TX Window
<CLEARRXWINDOW> - Clears RX Window
<NEWRXWINDOW:audiofreq> - Create RX Window on audiofreq
<NEWRXWINDOW:audiofreq:mode> - Create RX Window on freq. & mode
<CLOSERXWINDOWS> - Closes all secondary RX windows
<PIC?....> see: MFSK Picture macro commands at the end of this topic
<SAVEQSO> - Saves the data in the new QSO line the LOG
<CLEARQSO> - Erases the data in the new QSO line
<SENDQSL> - Send EQSL
<SENDQSLNP> - Send EQSL no prompt
<EXEC:command> - Runs the indicated command
<ASSCRIPT>script - Treats the remainder of macro as script
<SCRIPT:filename> - Run scrpt from file
<TNCSCRIPT:filename> - Script for 2nd TNC
<TELNETSCRIPT:filename> - Run telnet script
<SHOW:name> - Toggles the indicated toolbar ON
<HIDE:name> - Toggles the indicated toolbar OFF
The following toolbars can be toggled with the SHOW and HIDE Macros:
CONTROLBAR, LOGBAR, CATBAR, TUNINBAR, WORLDMAP, STATUSBAR, DXCLUSTER, CALLBOOK, TNC.
<WAVE:filename> - Plays the indicated *.WAV file
<STARTRECORD> Starts a WAV file recording.
<STARTRECORD:filenamemp3> Starts a WAV file recording to the file name.
<STARTRECORD:filename> Starts a MPEG3 file recording to the file name. (requires lame_enc.dll)
<STOPRECORD> Stops recording.
<FILTER:name> Turns on the DSP filter

Options for "name" include NONE, PASS, NOTCH, NOISE.
<REPLAY> - Replays sound history
<REPLAY:n> - Replays n seconds of the sound history
<SNAPNOW> - do snap now
<SEEKLEFT> - initiates the seek left command
<SEEKRIGHT> - initiates the seek right command
<INPUTVOLUME> - Set the soundcard input volume using the Windows Recording Control.
<OUTPUTVOLUME> - Set the soundcard output volume using the Windows Volume Control.
<TUNE> - send a tuning signal (ESC key aborts)
<TUNE:nn> - send a tuning signal for nn seconds
<DTMF:abcd> - Send DTMF sequence
<STARTSCAN> - Starts the scan feature
<STOPSCAN> - Stops the scan feature
<LASTCALL> - grabs the last call received and puts it in the Call window (also in <CALL>)
<GRABCALL> - grabs calla received from a stack Call window (also in <CALL>)
<ESCAPE> - works the same as the ESC key, stops auto CQ, etc..
<WORDMODE:x> Toggles word mode on and off, x=1 for on, x=0 for off.
<CAPITALSONLY:x> - x = 1 = on, x = 0 = off
<YAPPRECV> - YAPP receive
<YAPPSEND> - YAPP send
<YAPPSEND:filename> - YAPP send file

Frequency Control Macros

<FQ:fq_in_kHz> - Sets the tranceiver frequency
<ZFQ:fq_in_kHz> - Sets the tranceiver zero-beat frequency
<AUDIOFQ:fq_in_Hz> - Sets the audio frequency
<JUMPTOTXFQ> - RX frequency jumps to TX frequency
<ALIGN:fq_in_Hz> aligns to the specified frequency
<SPZOOM:n> set spectrum or waterfall zoom (0.5, 1, 2, 3, or 4 are available)
<SPSHIFT:fq_in_Hz> sets the spetrum or waterfall shift.
<BOOKMARK> - Toggle the bookmark on/off
<BMERASE> -clears all marks on this frequency
<CATCMD:text_command> - sends the text to the transceiver.
<CATCMDHEX:hex_command> - sends the hex command to the transceiver.
(This can be in 0A 3F 56 08 or 0A3F5608 formats)
<CATWAIT:ms> - CAT delay in ms.
<CATCMDDDE:text_command> - sends text via DDE
<CATTRANSVERTER:shift_in_Hz> - allows working with different transverters
----
<MEMW:n> and
<MEMR:n>
These macros are equivalent to Ctrl+n and Alt+n
and can be used to save and restore current frequency and mode.

Auto CQ Macros

<AUTOCQ> - Initiates the auto CQ routine as set under Options | AutoCQ
<ACQ> - Pause and restores AutoCQ mode.
<ASAUTOCQ> This assigns the current Macro as the AutoCQ text.
<ALARM:string> - Beeps when string is received

Macros that control Macros

<MACROS:filename> - load macros from file after this command, "filename" will be used as default macros
(instead of MixMacros.ini)
<MODEMACROS:filename> - load macros for this mode this command sets "filename" to store macros for this mode.
<EDITMACRO:name> - edit macro with specified name this command brings Edit User Macro dialog to edit macro that is
called "name".
<ONQSOBEFORE:name> run this Macro if QSO before

<HIDETEXT> - Don't show Macro in TX window
<SHOWTEXT> - Shows macro as usual
<QSOCMDDDE:command> -DDE command to external program.

Mode Settings Macros

<SQUELCH> - Toggles squelch.
<SQUELCHON> - Switches squelch on
<SQUELCHOFF> - Switches squelch off
<AFC> - Toggles AFC
<AFCON> - Switches AFC On
<AFCOFF> - Switches AFC Off
<SNAP> - Toggles Snap
<SNAPON> - Switches Snap On
<SNAPOFF> - Switches Snap Off
<INV> - Toggles inversion
<INVON> - Turns inversion on
<INVOFF> - Turns inversion off
<LOCKTX> - Lock TX Frequency
<UNLOCKTX> - Unlocks the TX Frequency
<LOCKTXTOGGLE> - Toggles the Frequency Lock
<MODESETTINGS> - Mode settings dialog
<THRESHOLD> - Displays the Squelch dialog box

RTTY Specific Mode Macros

<SHIFT:shift_n_Hz> - Sets the RTTY shift in Hz.
<BAUDRATE:baudrate> - Sets the baudrate for RTTY
<LETTERS> - fources letters
<NUMBERS> - fources numbers

SSTV Specific Mode Macros

<FONTSIZE:n> - Sets the font size
<FONTFACE:name> - Sets the font face to name
<FONTBOLD:n> - Sets the font boldness (n=0 for bold off, n=1 for bold on)
<FONTITALIC:n> - Sets the font italics (n=0 for italic off, n=1 for italic on)
<LOADPICTURE:filename> Loads the picture "filename" with a header
<LOADPICTUREONLY:filename> Loads the picture "filename" without a header
<LOCKMODE> - Lock current SSTV mode
<UNLOCKMODE> - Unlock current SSTV mode
<PUTHEADER:filename> Places the specified header file
<PUTRXPICT:x0:y0:x1:y1> - Put recvd picture into the specified rectangle
<PLACETEXT:x:y> - Place text as x, y
<PLACETEXT:x:y:text> - Place specified text to x,y
<TEXTSTYLE:n> - Set current textstyle

CW Specific Macros

<WPM:n> - sets the CW speed to n
<WPM:+n> - increases the CW speed by n
<WPM:-n> - decreases the CW speed by n
<WPM:RX> - Matches the TX speed to the RX speed
<LANGUAGE:xxx> - Select a language
<FORCELANGUAGE:XXX> - Force receiving as xxx

Rotor Control Macros

<ROTOR:SP> Turn rotor to the Short Path for the station in the <CALL> field.
<ROTOR:LP> Turn rotor to the Long Path for the station in the <CALL> field.
<ROTOR:n> Turn rotor to the specified azimuth using n

Contest Macros

See the Contest Operation topic in this section for details on these macros.

<SP1> Search and Pounce mode on
<SP0> Run mode on
<SP> Switch between SP and RUN modes
<INT> Output depends on content of CALL and RX EXCHANGE fields.
<INTELIGENT> Same as above
<STATS:GENERATEQTC> Send 10 QTC's
<STATS:REPEATQTC> Repeat the same 10 QTC's

Other Macros

<WKDPERIOD:nnn> QSO is ignored if more than nnn minutes elapsed
<WKDIGNODREBEFORE:date time> QSO is ignored before specified time
<PTTON>, <PTTOFF>, <PTTSWITCH> Switch the TCVR PTT
<PRINTQSL> Put selected QSO line into QSL print queue
<FROMCLIP> Get picture from clipboard (SSTV mode)

Event Macros

Event Macros are entered using the Edit Macros window. See the Configuring Macros topic in the Configuration and Set Up module for details.

OM --called if <NAME> is called and Name in log is empty
OnAlarm --called when alarm condition is met (see ALARM macro)
OnCR --called when Enter is pressed with focus in Log (also see <INT>)
OnCR# --called when Enter is pressed with focus in Log field #
OnStartMode --called when current mode is started
OnEndMode --called when current mode is exited
OnTX --called when TX is initiated
OnRX --called when RX is initiated
OnStartMixW --called when MixW is started
OnEndMixW --called when MixW is stopped
OnOpenTNCWindow --called when TNC window is opened
OnCloseTNCWindow --called when TNC window is closed
OnOpenTelnetWindow --called when Telnet window is opened
OnCloseTelnetWindow --called when Telnet window is closed
OnSaveQSO --called when QSO is saved
OnRemoveQSO --called when QSO is removed
OnEnter# --called when band # is entered (set in bands.ini file)
OnLeave# --called when band # is left (set in bands.ini file)
OnGrabCall --called if two same calls are received OnGrabCallTx --called when call is grabbed from keyer OnGrabNumber --called when (serial) number is grabbed ------------------------

Further explanation on the use of some of MixW's special Macro commands:

OnEnter# If, for example, you had a set of MARS macros defined in a file named MARS.mc, and you were working MARS in the 150 meter band, you would first define the 150m band in the bands.ini file, and then you could define the macro OnEnter150m as <MACROS:MARS.mc>.

OnCRm This macro tells MixW what to do if CR is pressed while focus is in the log in field m. If m is omitted it applies to any field. This macro is specified in the default macros dialog. Use with <CURSOR:n> macro to move the cursor to field n in the log.
Example: After entering Call (field 5) and hitting Enter you want the cursor to jump to the field Rx Exchange (field 9) then

declare the macro OnCR5 as <CURSOR:9>.

CWID: To add a CW ID to the default signoff macro you must first define it under Personal Data. Select Configure | Personal Data. This brings up the personal data window. Check the "use CWID" box and then enter your sign off CW ID text, then uncheck this box to avoid sending the CWID when you don't want too. Next add <CWID> to the end of the macro, such as, 73 <CALL> DE <MYCALL> SK<CWID>. Of course, <CWID> can also be assigned to a separate function key, as can <TIME> and <DATE>, but MixW's log also logs the time and date automatically. If you use CW ID, keep in mind that while it is executing, the other station is printing only garbage. For that reason, you might want to use CW ID only at the end of your signoff macro.

AutoCQ:
Auto CQ is a very handy Macro that enables you to transmit a predetermined CQ sequence at regular intervals. It will stop automatically when a call sign is received (indicating that your CQ has been answered). AutoCQ must first be configured by selecting Options | Auto CQ | Text. It can then be configured just like any other Macro by using the following dialog box:
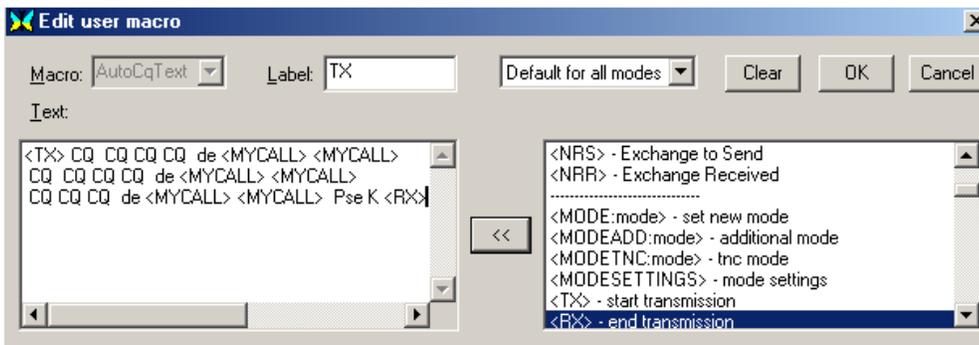
When you're done configuring this click OK to save it. Then select options | Auto CQ | Delay, which brings up the following box:

Enter the delay in seconds you want between your AutoCQ transmissions. Next simply assign <AUTOCQ> to one of your Macro Keys as any other Macro.

You can initiate AutoCQ in three ways: Click on the button you have assigned it to, depress the key you have assigned it to, or select Options | Auto CQ | Start. You will see the AutoCQ indication box appear above your cursor in the spectrum or waterfall display. AutoCQ will cycle until a call sign is received in the RX window, when it will automatically stop (MixW knows that your CQ has been answered!). You can manually stop AutoCQ by depressing the Escape Key, or by Selecting Options | Auto CQ | Stop.

By selecting Options | Auto CQ | and Watch squelch, AutoCQ will then only operate when your RX is squelched, thereby avoiding accidentally transmitting over the top of an existing QSO.

<ASAUTOCQ>
Using this Macro command at the beginning of any Macro string will define it as the new AutoCQ text and commence to AutoCQ with it when selected. This enables MixW to have multiple AutoCQ strings. For instance you could define one for a contest or special event station, and still leave your default AutoCQ text for your normal operations.

<WAVE:filename>
Plays the indicated *.WAV file. This is very handy to use as a voice Keyer for contesting or otherwise calling CQ or other automated voice responses. Simply record wave files using the Windows Sound Recorder (included with Windows) or another digital recording program and save them as .WAV files. Then you can configure your Macros to replay your voice as recorded all automatically. For instance the following Macro would be used for calling CQ in a contest:
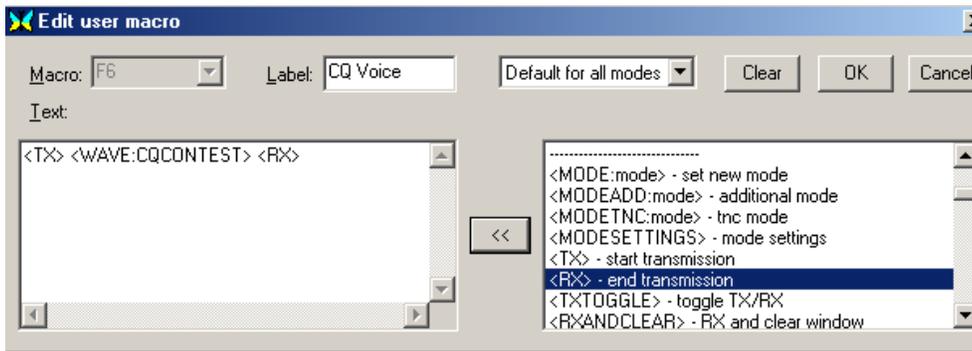
Where CQCONTEST is the name of the pre-recorded .WAV file of my voice saying, "CQ Contest CQ Contest CQ Contest CQ Contest, this is K4SET calling CQ Contest". For this Macro to work, you should be in SSB, AM, or FM phone modes. Then by initiating this Macro (by clicking on the button or depressing the F6 key in this case) MixW will automatically key your transceiver, then play your recorded voice calling CQ through the soundcard to your transceiver's input audio, then it will switch back to receive while you just sit by and listen for answers. You can likewise pre-record any number of other transmissions including reports or QRZ type end of contact calls. This can really save you voice during a long contest or special event operation.

Note: <WAVE:filename> can also be used in conjunction with your <AUTOCQ> or <ASAUTOCQ> Macros to use the voice keyer to automatically call CQ.

<TEXTFILE:filename> - Inserts the indicated text file
When creating or editing a text file (.txt) for use with a Macro, be sure that the file is terminated by hitting the "Enter" key on the computer keyboard. This will place a cr/lf at the end of the file. Without the "Enter" at the end the file will not be sent to the TX window, but will just produce an empty line.

<INIFILE:file,section,name> - insert a line from an ini-file.
Suppose I have a program that measures the temperature using a sensor outside of the house and periodically writes the value into d:\emp\ensor.ini file:
--- start of d:\emp\ensor.ini ---
[Sensor]
Temperature=xx
Humidity=yy
Illumination=zz
--- end of d:\emp\ensor.ini ---

Then I can make a macro:

The current temperature in Kiev is
<INIFILE:d:\emp\ensor.ini,Sensor,Temperature> degrees centigrade.

<INIFILE:friend.ini,[HI],<CALL>> - is a special application of the INIFILE macro for use with the friend.ini file.
The format of the friend.ini file is:
[HI]
UA4FCO=Yuri
DS4AEM=Cha
F5NBX=Meuzac
. . . etc. . .
One way to use this macro would be to combine it with the <OM> macro. To edit the OM macro go to Configure | Default Macros and change the Text to <INIFILE:friend.ini,[HI],<CALL>>. Now when you use the OM macro, if there is no name in the current log Name field, the Call will be looked up in the friend.ini file and the name found there will be transmitted. If the call is not found, nothing will be sent.

MFSK Picture macro commands:

A picture file of about 250 x 200 pixels can be sent using the following macro commands:
<PIC?N> - same as selecting File | Send Picture... | B/W...
opens dialog box to select picture file, sends in black and white
<PIC?N%C> - same as selecting File | Send Picture... | Color
opens dialog box to select picture file, sends in color

<PIC:filename.ext%2000> - sends picture file in high resolution black and white

See the MFSK Topic in the Digital Modes Section of this Help File for more information.
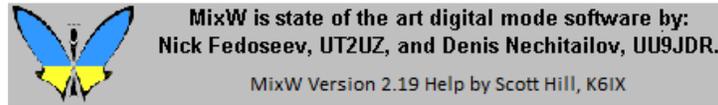
MixW: Script Commands
_____

Script commands are written one per line. A line beginning with a semicolon is considered a comment. Invalid commands are skipped. The following information is taken from Nick's website.

The following Script commands are available in MixW:

send "string to send"
- String may include control characters, for example, "^C"

timeout n
- The following waitfor commands will timeout in n seconds

waitfor "string to wait for"
- Wait for this string before continuing (^C, etc. allowed)

sleep n
- Sleep n seconds

Pause
- Pause and wait for operator to press "Continue" button

Close
- End the script and close the script window

runmacro "macroname"
- Run this macro (example: runmacro "FQ:14071")

sendmacro "macroname"
- Insert macro as text (example: sendmacro "MYCALL)

_____

Macros used with scripts

<SCRIPT:filename>
- Run script from a file

<ASSCRIPT>
- Treat the rest of this macro as script

<TNCSCRIPT:filename>
- Run script on the second TNC

<TELNETSCRIPT>
- Run script file in Telnet window
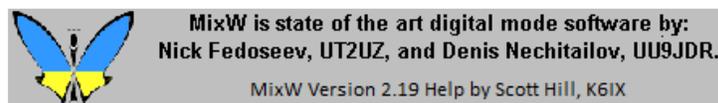
MixW: The Eye of a Needle (TEOAN)
_____

by Denis Nechitailov, UU9JDR

MixW 2.12 and later versions offer an unique feature of connecting a PC with TEOAN program and MixW RigExpert plugged to a transceiver into a local area network.

Then, running MixW 2.12 on another computer on a network (or via high-speed internet connection) makes possible operating digital modes using that remote transceiver.
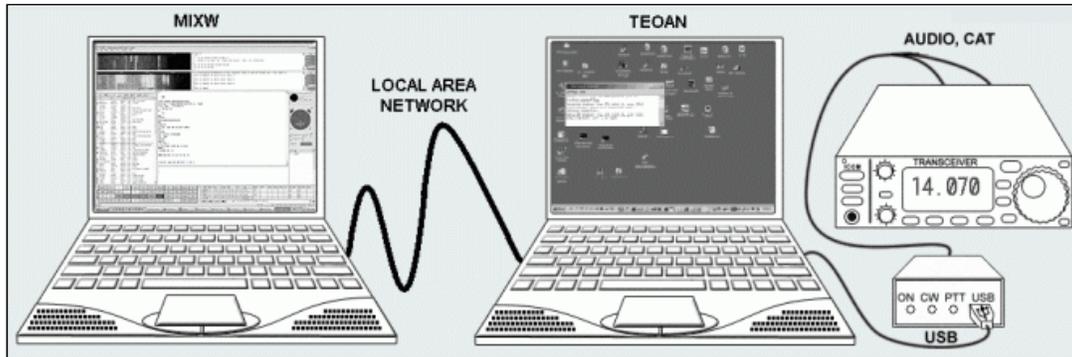
*Left side: computer (network name: **dn-acer**) running MixW software*
*Right side: computer (network name: **dn-compaq**) with MixW RigExpert connected.*

In the TEOAN program, set the virtual COM port number for MixW RigExpert and a TCP port number (the default value is OK in most cases).
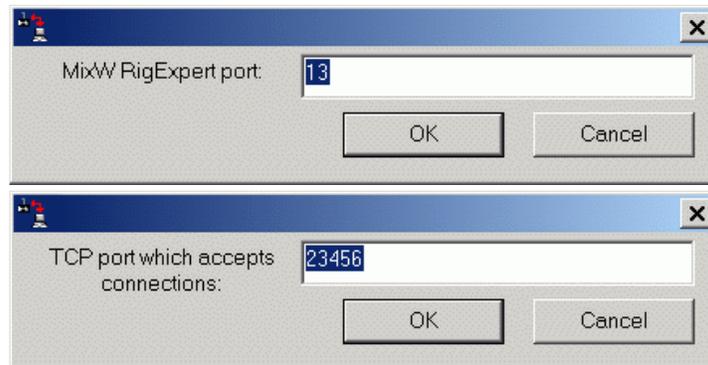
*TEOAN settings at **dn-compaq** computer.*

In MixW2, choose "The Eye of a Needle" as an audio device. Enter an IP address or a name of the computer with TEOAN running, and the same TCP port value.

Please make sure that the CAT port speed is set properly. See the TRCVR CAT/PTT dialog from Configure menu.
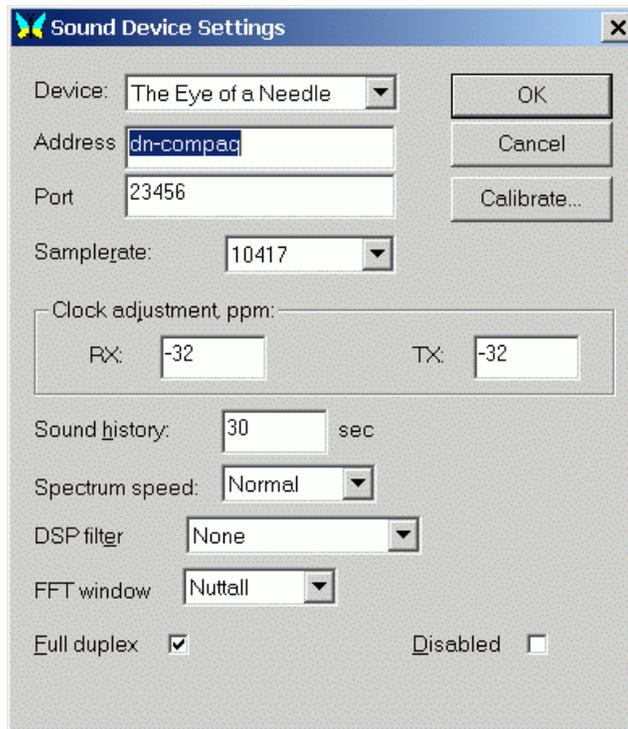
*MixW sound device settings at **dn-acer** computer.*

Note: the sound stream is not compressed, so no loss of quality is expected but on the other hand the data rate is high, up to 0.4 Mbit/sec (RX or TX) or 0.8 Mbit/sec for TX in full duplex mode. Usual 10 Mbit LAN is good enough for this application, but slow modem connections will not be able to handle such a big stream of data.

The TEOAN program is located in the MixW directory. Copy TEOAN.EXE from the computer with MixW installed to the other computer (create a separate directory).
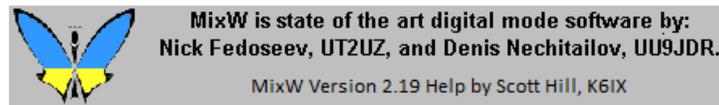
MixW: TNC Configuration and Operation
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With thanks to RICHARD B. GRIFFIN, NB6Z

TNC operation is accomplished in MixW by providing a communications link (using a serial port) between the PC running MixW and the TNC. The PC will act as a "terminal" to send commands to the TNC and display characters sent from the TNC. In this configuration the TNC will be operated in the "command" mode and not in the "host" mode, as would be done if a "host" program like XPWin or KaGold were being used. In command mode appropriate commands are used to correspond with the model of TNC being used. The command structure for your TNC should be available in the Operator's Manual provided from the TNC manufacturer.

To configure MixW for TNC operation, first select Configuration | TNC Settings, which brings up the following dialog:
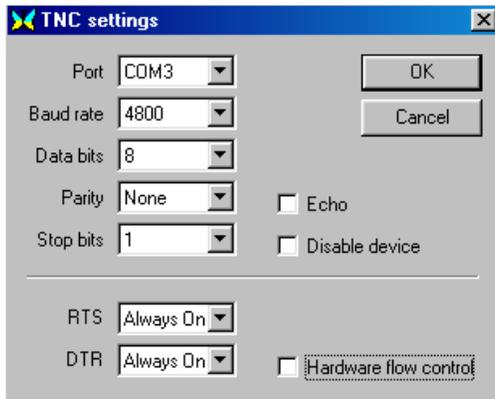
Set these parameters to the same values that you were previously using with your TNC or refer to the TNC Operator's Manual for the com-port setup information. You have the option to "echo" all commands back to the MixW screen. Normally you will leave ECHO unchecked.

Next, select Mode | TNC mode settings, which will bring up the following dialog:
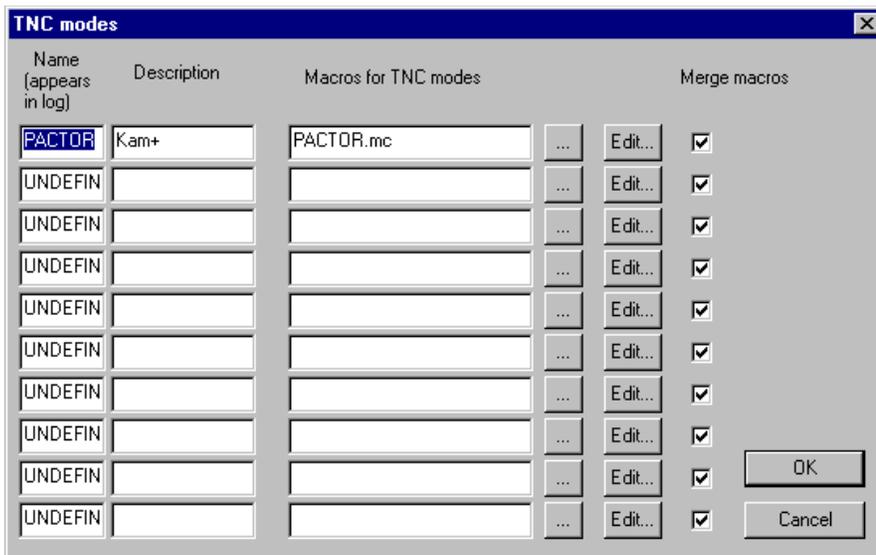
On the first UNDEFINED line in the list replace the word UNDEFINED with the name of the TNC mode as you want it to be shown in the log. In the Decsciption column enter information to further identify the mode. Then in the "Macros for TNC modes" column enter the file name (ending in .mc) that you will use to save the macros for this mode. The button with the (...) may also be used to browse for a file on your disk if you have imported a file or made a previous file. Then click OK.

Now you can start a TNC session by selecting Mode | TNC modes | <the mode from your TNC modes>
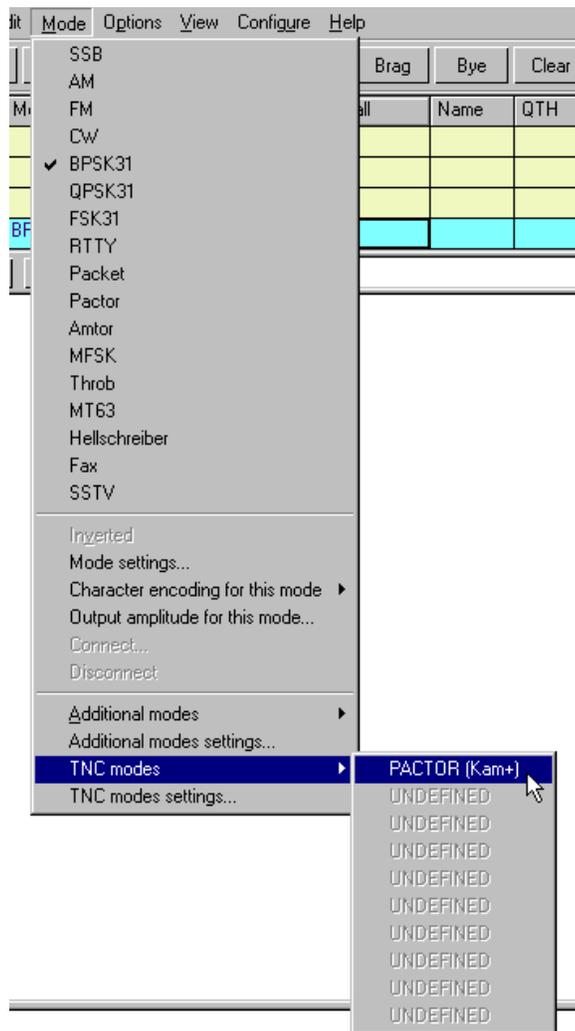
If you have Configure | Merge macros checked, your default macros will still show up on the macro buttons, but you can now define or redefine your macro buttons specifically for the TNC mode you are in.

As a very simple example, you can create a macro button to start the TNC "command" mode (<CTRL-C>X for the KAM) and then type commands directly into the TX window and execute them by hitting the ENTER key. To do this, first right click on the button you want to use. If you right click on F4, for example, you will see this dialog:
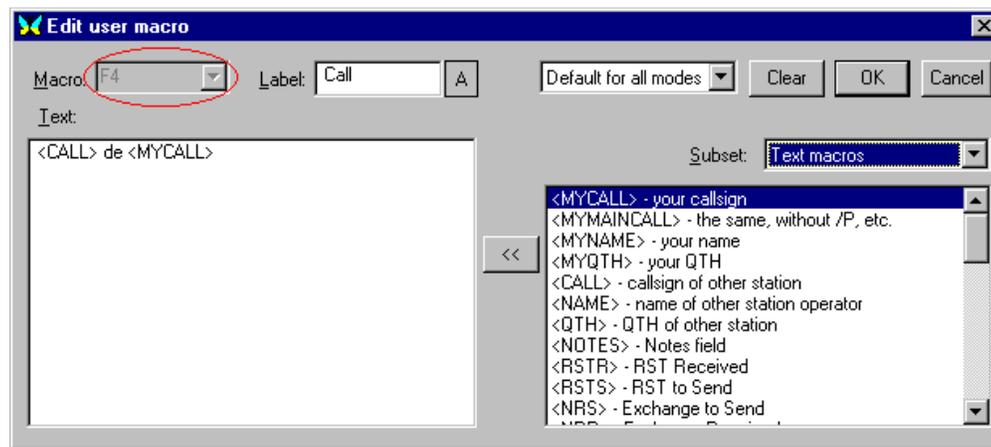
You can convert this macro to be used to initialize the TNC by changing the label to "TNC Start", changing "Default for all modes" to "For this mode", and replacing the contents of the Text window with: <CTRL-C>X. Click on the OK button when finished. Now you can click on your "TNC Start" macro button to put the Kam into command mode and then begin to type TNC

commands directly into the TX window.

When you want to leave the TNC mode select Mode | <any other mode> and the F4 button will revert to its previous state.

Obviously you would not want to operate your TNC this way for very long, so now you can continue to redefine other macro buttons for the various TNC functions and actions you want to use.

Two very important macro commands for configuring your TNC are OnStartMode and OnEndMode which will allow you to automatically initialize the TNC when the TNC mode is selected and leave the TNC in the appropriate state when you leave the TNC mode. Event macros such as OnStartMode can not be edited with the right click method outlined above, since they do not show on a button. To add event macros to a macro file select Configure | Macros for this mode, brouse for the file your want to modify, and then click on the Edit button.

A sample macro file for the KAM TNC called pactor-kam.mc is provided with the MixW program. You may use this file to operate Pactor mode on a KAM TNC and duplicate/modify it for other KAM TNC modes like G-tor and Amtor. If you have another manufacturer's TNC, you should use this file as a template to create macro files with the commands specified by your TNC manufacturer.

> MixW is state of the art digital mode software by:
> Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.
> MixW Version 2.19 Help by Scott Hill, K6IX
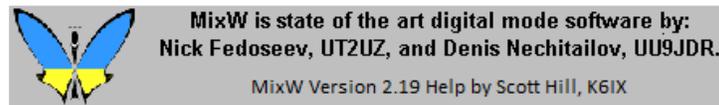
MixW: Voice Keying with MiXW in Phone SSB, AM, FM Modes
_____

By Jim Jaffe, WA2VOS

One of the best things in MixW is its' ability to use WAV files in the SSB Mode for Voice Keying. I've made up a few Macros which I use constantly to call CQ thus saving my voice when the band appears to be Dead! I have a macro for each band starting with 10 and ending with 75 meters.

In order to use the WAV file you need to be in SSB mode! Go to the Modes Menu and Select SSB. You can make as many Macros as you wish following this format:

<MODE:SSB> (type exactly as shown)

<WAVE:C:\program files\MixW\SSB3.wav>

1
2 Type of file   3 Location of tile   4 File name

(Fig. 1 Mode, Fig. 2 Type of File, Fig. 3 file Location, Fig. 4 File Name)

You can transmit in any mode you like ie; AM LSB USB FM using your Rig's mode control or if you're running CAT mode click the Mode from USB to any other you prefer..most common would be USB/LSB as most of us use Single Sideband modes.

A very quick and easy way to create a WAV file: The following are 3 macros each one is separate and apart from the other.

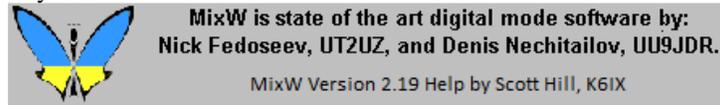<STARTRECORD:echo.wav>   = start recording voice into the specified file

<STOPRECORD>   = stop the above record

<WAVE:echo.wav>   = play it now

All voice keying files are titled SSB#.wav

Second Method for Creating WAV files: To create the file click Start, go to ALL Programs /Accessories/Entertainment select Sound Recorder. You get 60 seconds of recording. Save file as SSB#.wav. Try the default settings of the Sound Recorder and test with your rig using a Dummy load.

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX

Using MixW Weblookup
_____

By Jim Jaffe, WA2VOS

1. Unzip the contents of Weblookup4.zip to your MixW Folder.

2. Run MixW and go to the Modes Menu located at the top of the MixW Screen.

3. Select Additional Modes Settings see Figure #1.
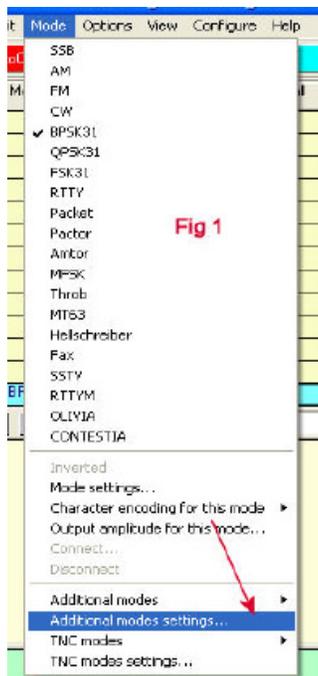
4. When you click the the Additional Modes Settings a dialog box will then open and you will fill out the box as shown in Figure #2.
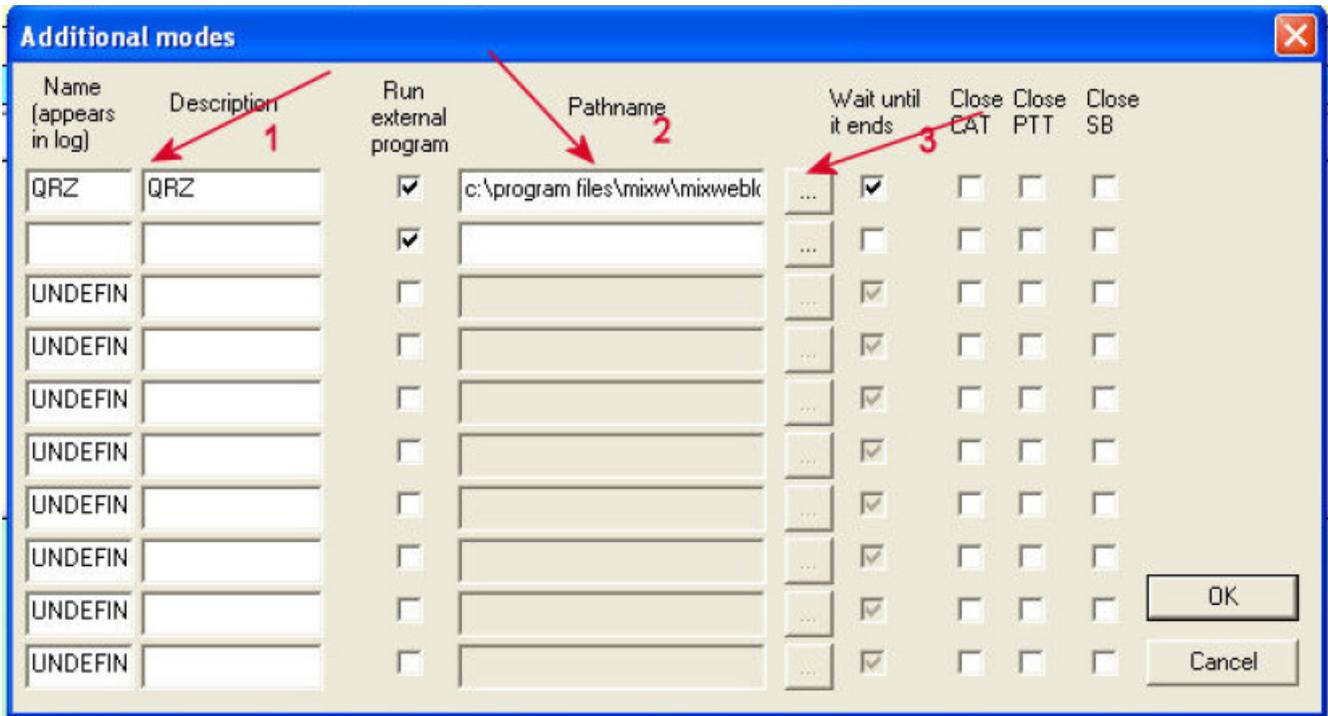
Looking at Figure 2 note Arrow 1. Fill in the title. I used QRZ. Arrow 2 is the path that MixW will use to access the mixweblookup program. Note the button at arrow 3. Click that as it is the Windows Browse and go to c:\program files\mixw and locate the file titled mixweblookup.exe.

Notice to the right of the button there is a check mark in the box. Be sure to put one there. Click the OK button when finished, and you're all set.

To activate the program go back to the Modes Menu and select Additional Modes. See Figure 3.
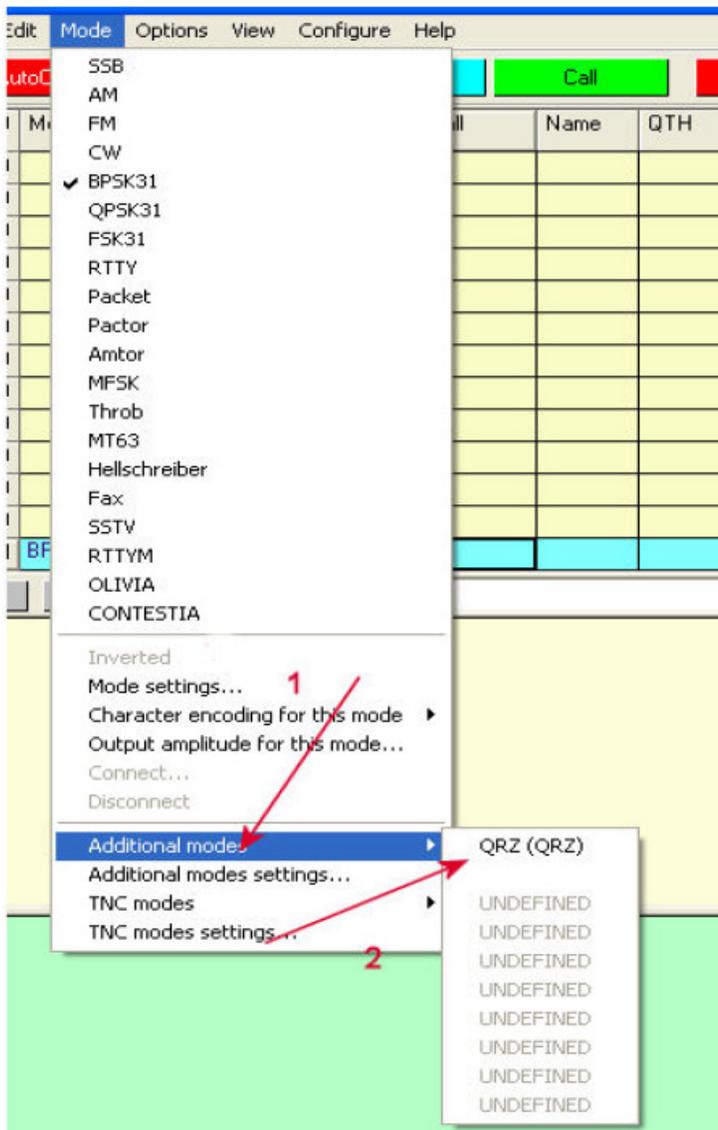
When you click the option at Arrow 1 the menu of available external programs will appear and you can click the QRZ (QRZ) program and it will then be activated. As soon as a callsign is entered in the log bar you can click on the Search button and the program will lookup the call. If it's a Canadian call this Search will go to the Canadian callbook, if it's a Russian call the Russian callbook will be displayed.

Tip: You can click Page 2 on the MixW window and the MixW lookup will minimize. To go back and forth between the program and MixW do Alt Tab which allows you to Tab between those programs running in the background.
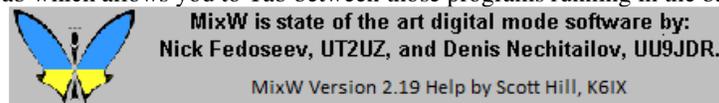
MixW: Using MixW with DXAtlas
_____

By Finn Helmuth Pedersen, OZ6LI

You will need to make a few preparations in order for MixW and DxAtlas to work together :

Go to the MixW site to get the latest MixW version, and then DxAtlas.

Now follow this sequence:

1) After downloading the files, install in the usual/suggested MixW and DXAtlas directories.

2) Download the Visual Basic source code and Exe file:
www.mixw.net/files/Mix2DxAtlas1.zip
After download unpack the file into your MixW directory.

3) Third step is to create a Macro within MixW:
Load MixW and create a new Macro, e.g. with the name of "ATLAS".

This macro will need the following content:
<EXEC:C:\Programmer\DX Atlas\DXAtlas.exe>
<EXEC:C:\Programmer\MixW\Mix2DxAtlas.exe>
Of course the path names will depend of your actual paths.

The first line is to initially activate the DxAtlas program from within MixW. The second line awakes the DDE data transfer program Mix2DxAtlas.
Now you are ready to utilize the benefits of the great Digital program (MixW2) in "tandem" with the great DX Atlas program.

1) Load MixW as usual.
2) Click on your newly created macro button "ATLAS".
3) The DxAtlas is now loading, as well as the DDE routine Mix2DxAtlas.exe
4) After some seconds a smaller DxAtlas window pops up in the upper left corner.
5) Enlarge the atlas to the whole screen.
6) To get the Mix screen back, click the Mix Butterfly at the very bottom. Click a couple of times to watch MixW and DxAtlas screens toggling.

Daily work with DxAtlas and MixW:
Use MixW as usual. Select a station in the waterfall and click on the callsign in the RX window. As soon as you click the call, data will automatically be transferred to the DxAtlas. To actually see the result of this transaction, toggle the screens by clicking the Mix Butterfly at the bottom of the screen. Now you will see the "DX" station placed correctly on the world map.

Of course the station is placed in the middle of a Prefix area. But if you, for instance, copy your Callbook CD to your hard disk, latitude and longitude data for the station in question (if present in callbook) will be transferred to DxAtlas as well. The station will then be placed right on spot in the map.

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.

MixW Version 2.19 Help by Scott Hill, K6IX
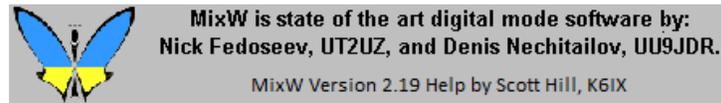
Using MixW with other Programs
_____

By Denis Nechitailov, UU9JDR
MixW provides DDE interface to pass data to another program. See the MixW DDE test.doc file from MixW directory for the list of available items to transfer.

Using DDE for printing QSL cards.
See MixW QSL card test.doc file from MixW directory. This file shows a sample QSL card. Names, QTHs and other data are automatically updated in Microsoft Word document when you change them in MixW. Normally, current QSO is shown. To print a previous QSO, select it from the list in Search Results dialog.

Three files are required for printing QSL cards. They are:
MixW DDE test.doc

MixW QSL card test.doc
StarOffice MixW DDE test.sdw

If any of these files are not in your MixW program folder download them as follows:

Download the Microsoft Word DDE test file:
mixw.net/files/MixW%20DDE%20test.doc

and the MixW DDE test.doc and sample QSL card:
mixw.net/files/MixW%20QSL%20card%20test.doc

Download Sun Star Office notes:
mixw.net/files/StarOffice%20MixW%20DDE%20test.sdw
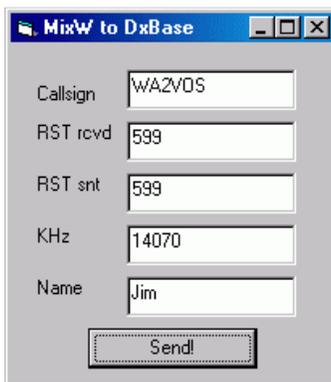
Using DDE to pass QSO data to external loggers.
Here is a sample application to pass data to DXBase 2002 software.
http://www.dxbase.com
Download Visual Basic source code and EXE file:
http://mixw.net/files/Mix2DxBase4.zip.

(All Visual Basic EXE files require Visual Basic 6 DLLs to be present in your system.)

Click Send! button to send data to DXBase.

Or, create keyboard macro (for example, for F2 key):
Macro: F2
Label: Save
Text: <QSOCMDDDE:WRITE><QSOCMDDDE:>
Then use F2 to get the same result.
MixW also automatically generates <QSOCMDDDE:Send> when you press Save QSO button, and <QSOCMDDDE:Remove> when you press Remove QSO button.

Using DDE to pass data to external maps.
Here is a sample application to pass data to DX Atlas software (www.dxatlas.com).
http://www.dxatlas.com/.

Download Visual Basic source code and EXE file:
http://mixw.net/files/Mix2DxAtlas1.zip.
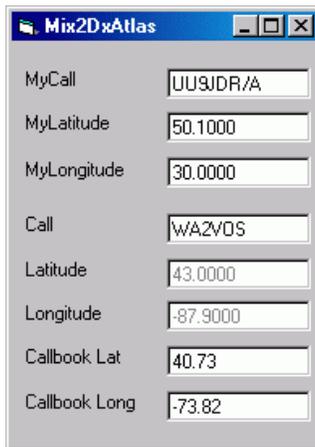
This sample program plots your own and other operator's position on the map. If you are using a callbook and it contains the other operator's coordinates, they will be used instead of approximate ones calculated from his callsign.

Using DDE to switch/rotate antennas.
Download Visual Basic source code and EXE file:
http://mixw.net/files/MixAntSw1.zip.
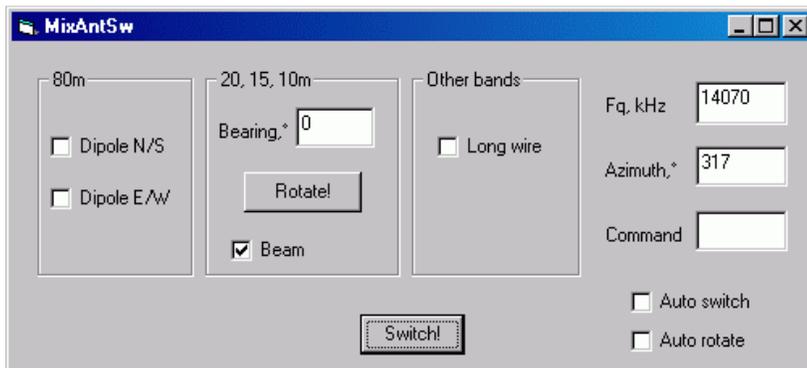
Suppose you have two perpendicular dipoles for 80m (North/South and East/West), a multiband beam for 20,15, and 10m and a long wire antenna for other bands.

This program demonstrates the possibility of automatic switching between all your three antennas and rotating the beam.

Click Switch! button to switch the antennas depending on the current frequency (80m dipoles also depend on the azimuth).

Click Rotate! to rotate the beam to the other station direction.

To initiate switching and rotating from MixW window, create two keyboard macros (e.g. F3 and F4):
Macro: F3
Label: Switch
Text: <CATCMDDDE:SWITCH><CATCMDDDE:>
Macro: F4
Label: Rotate
Text: <CATCMDDDE:ROTATE><CATCMDDDE:>
Now F3 will switch antennas, and F4 will rotate the beam.
Check "Auto switch" and "Auto rotate" to start switching and rotating immediately when the frequency or direction changes.
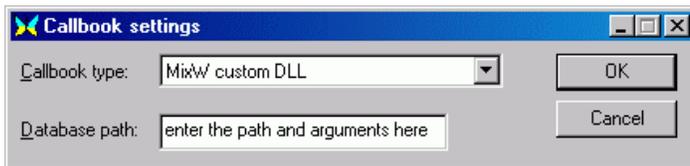
Custom Callbooks
Using external DLL driver, it is now possible to use callbooks not directly supported by MixW.

Writing callbook drivers in C language.
Download C++ source code and DLL file:
http://mixw.net/files/MixCallBook1.zip.

Place MixCallBook.dll file to MixW directory. Then open Callbook Settings dialog and select "MixW custom DLL" as callbook type. Enter the database path and other data passed to the DLL (not needed in this sample).

This sample DLL does not contain an actual database and returns data only for UU9JDR (yes, megalomania). But it could be easily extended to support a real database file. See included C++ files for details.

Writing callbook drivers in Visual Basic.
Using a "bridge" DLL written in C language, it's possible to use Visual Basic ActiveX DLL as a callbook driver.

Download C++ and Visual Basic source code and DLLs:
http://mixw.net/files/MixActiveXCb1.zip.

Copy both DLLS (MixActiveXCallBook.dll and MixCallBook.dll) from the ZIP file to the MixW directory, then register ActiveX DLL by typing

regsvr32 MixActiveXCallBook.dll

Now choose the "MixW custom DLL" as Callbook type in Callbook Settings dialog to activate the "bridge" DLL.

This sample Visual Basic ActiveX DLL opens MsgBox windows in response to initializing DLL, it's deinitializing, and callsign lookups.
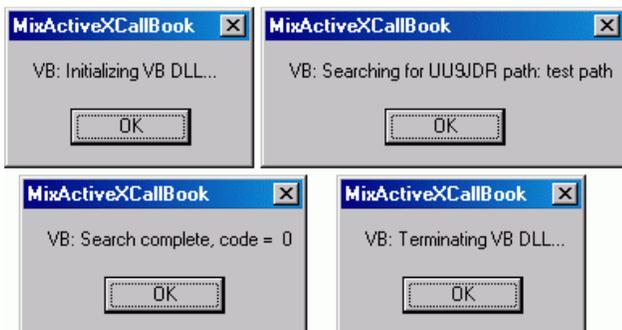
It also returns data in response to searching for UU9JDR.

You do not need to modify the MixActiveXCallBook.dll written in C language. Add your code to three Visual Basic functions to support your callbook database, it's easy:
Private Sub Class_Initialize()
' Add your initializing code here
...
End Sub
Private Sub Class_Terminate()
' Add your terminating code here
...
End Sub

Public Function LookupCall(Path As String, Callsign As String, ByRef Info As String) As Long
' Add your lookup code here
...
End Sub
See sample Visual Basic project from VB directory of the ZIP file for details.

Searching at WWW callbook sites.
Howard, KH6TY suggested running Internet Explorer to open search page for current callsign.

Download the Visual Basic source code and EXE file:
http://mixw.net/files/MixWebLookup3.zip.

This sample program automatically opens different callbook pages depending on the country of callsign owner.

For Canadian calls, it opens the search page at www.rac.ca.
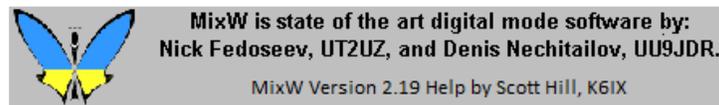For Russian calls, www.octavia.com.
For any other calls, www.qrz.com.
To start search, enter a call into Call field in MixW, then click Search button in this program. To start search from MixW window, create the keyboard macro (e.g. F4):
Macro: F4
Label: Search
Text: <EXEC:MixWebLookup><QSOCMDDDE:>
This program does not parse the page and does not fill Name or QTH fields. It only shows the whole page in it's window.

MixW: Using the Spectrum Display
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By Jim Jaffe, WA2VOS

MixW offers two separate displays for tuning purposes which would be the ubiquitous Waterfall and the Deluxe display which is the Spectrum display. The essential difference is the WATERFALL is NOT a REAL TIME display but an average of the signals and any attempt to tune a signal in with that display using the VFO knob results in a blurred trace in the direction that the VFO knob is turned.

With the Spectrum display there are actually two signals displayed: the Peak is the real time display, and the Average Curve is the Peak in Average time. Keep that Average curve in mind as that will come in handy later on. You can toggle between the Waterfall and the Spectrum Display using the keyboard shortcut "ALT-W".

To set up the Spectrum go to the View menu and select the following items:
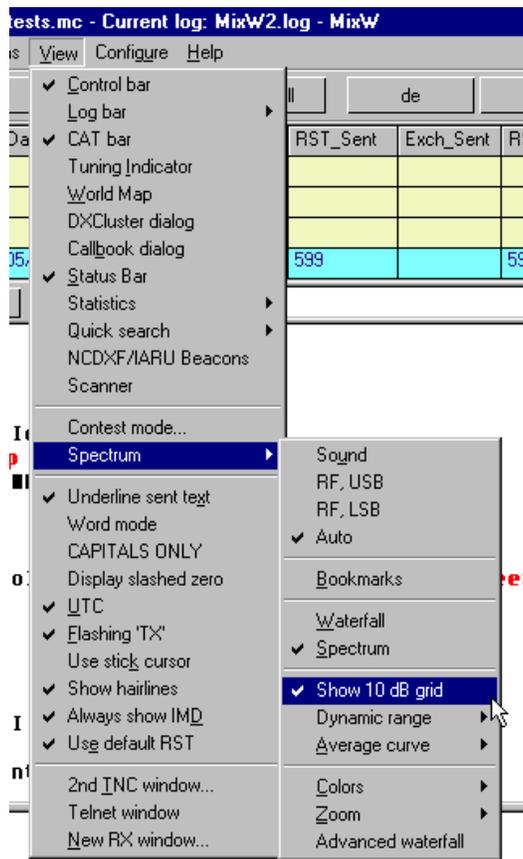
 Scroll down to the Spectrum highlight and then Select Average Curve then Select Show 10DB grid. The colors are up to you. The colors in my illustrations are Orange for the Peak Curve, and Yellow for the Average Curve. The illustration below shows the Peak Curve as an inverted "V" in Orange, and the Average Curve as a Yellow "V".
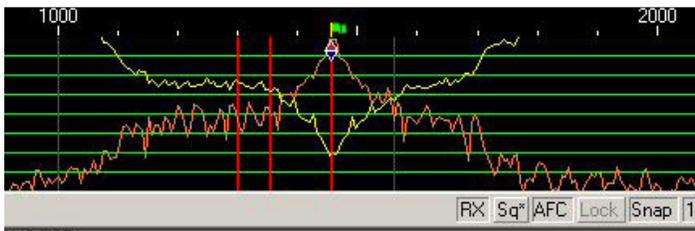

Using the Spectrum it is very easy to see the signal and be able to tune it. If you need to use the Notch Filters just put your cursor on each of the individual peaks one at a time, right click and choose Set Notch filter and you will have completely eliminated the offending signals. In the Spectrum display you can see exactly where they are in relation to the signal you're trying to receive.
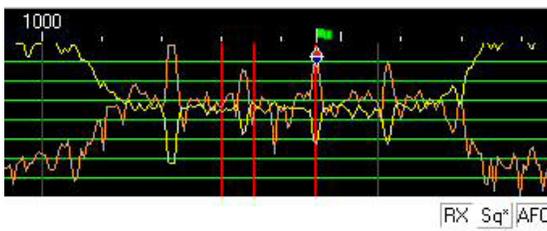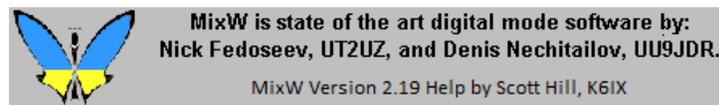

In the illustration you can see the filter skirts and how well you are using the filters to isolate the signal you want to copy. Working with the Spectrum display really makes it easy. Take a look at this illustration with a 500 Hz IF filter and center frequency about 1360 Hz
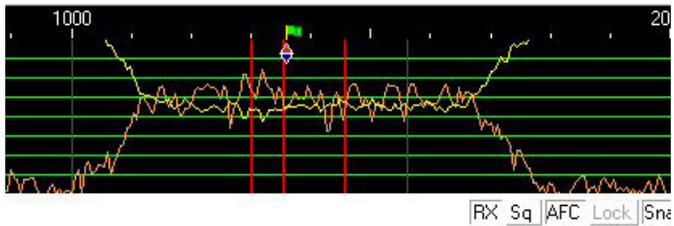
Tuning an MFSK signal is very difficult with the Waterfall as only the initial tone trace is visible. If you lose the sync you will have to wait until you can see a better trace. With the Sprectrum you have to keep the multiple peaks in between the two Cursors. Once that is achieved you are printing the MFSK signal quite easily. The same applies to a RTTY Signal which this illustration depicts.
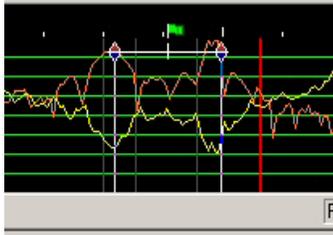
 As you can see the Spectrum Display is so effective that I never use the Waterfall. I only use the Waterfall display to report Sidebands on the sending station's signal upon his/her request..

MixW is state of the art digital mode software by:
Nick Fedoseev, UT2UZ, and Denis Nechitailov, UU9JDR.
MixW Version 2.19 Help by Scott Hill, K6IX

MixW: Using the Waterfall--Step by Step
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This topic is about using MixW without a CAT (computer control) interface, and understanding what is going on with the waterfall and the frequency markers. This Topic may be particularly usefull for hams who are converting to MixW from other digital mode programs.

How Hard Could This Be?

MixW makes using the digital modes so intuitive that it may not occur to you exactly what is happening on the screen in front of you until something unusual occurs. So let's look carefully at the process of tuning in a BPSK signal in MixW, assuming that your radio and computer are all hooked up and ready to go.

Step 1.
Start MixW and set your transceiver to 14,070,000 Hz. (14.070 MHz.), Upper Side Band (USB). If your waterfall is blank, go back to the Configuration and Set Up Section. If you have something in the waterfall, go to Configure | TRCVR CAT/PTT (in the MixW Menu) and click the "Display zero beat frequency" box to put a check mark there, and then click the OK button. Then select View | Spectrum | Auto. If Auto is not checked, click on it with the mouse to select it. Now right-click the mouse in the waterfall and select Zoom x2 from the pop up menu. The center of your waterfall and Status Bar should look something like the following illustration.
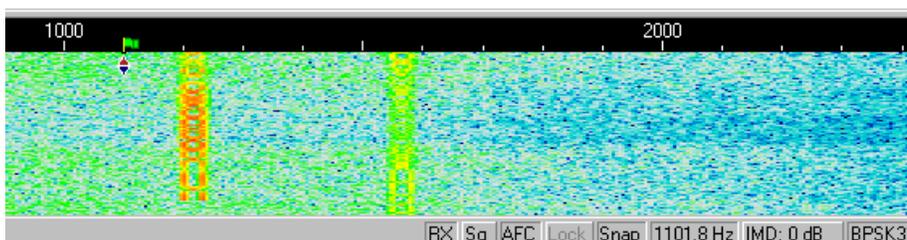
In this example there are two fairly strong BPSK31 signals in the waterfall, one just above 1200 Hz, and one at about 1580 Hz.

You can also see the red and blue triangles with the green flag at 1100 Hz. In the status bar you can see that the mode is BPSK31, the RX, AFC, and Snap options are selected (pushed down), and the Squelch (Sq) and Lock options are not selected (are not pushed down).

If you move your mouse pointer into the waterfall and left click with the tip of the mouse pointer (arrow) in the center of the strongest signal, the green flag with the red and blue triangle will move to the center of the signal (about 1205 Hz in the example above), and the text of the QSO should start to print in the RX pane.

If the signal you are "printing" is a ham calling CQ, you can answer the call by left clicking with the mouse on the RX button in the staus bar (which will then change to TX) and typing your outgoing text into the TX pane (between the RX pane and the Waterfall).

Now, if you only want to work casual 20 Meter PSK31 contacts, you've got it mastered. But probably you've got a few questions. For example, if you like to log the exact frequency of your QSOs, what frequency would you log for that contact at 1205 Hz on the Waterfall?

Frequency
For both CW and SSB we are accustomed to simply using the dial setting as the frequency when we make a schedule, or log a QSO. This works because everything else is pretty much set by convention. With the digital modes the conventions are still developing, so you have to know what questions to ask.

The proper way to specify a digital frequency is as **the center of the RF signal**. If you look at a digital signal on your waterfall you can see where the center of the signal is because there is a little flag there! So the real question is: what is the RF frequency where the little flag is? Like so many things in ham radio, the answer is: "It depends". And what it depends on is the sideband.

Sideband
The digital modes do NOT change sidebands when they change bands. In other words you ALWAYS use Upper Side Band (USB) for soundcard digital modes on all bands (at least until you get to the tricky stuff). So knowing that you will be using USB how do you find an RF frequency in the MixW waterfall?

You do a little arithmetic. You know that in SSB your radio dial shows the frequency of the suppressed carrier, and that for USB the audio signals will be at a frequency higher than the suppressed carrier. So, to calculate the RF frequency of the QSO in the example above, just add the frequency of the suppressed carrier (transceiver frequency) to the audio frequency shown by the position of the flag on the MixW waterfall and you have the RF frequency of the signal (14.070,000 Hz plus 1,205 Hz gives 14,071,205 Hz. or 14.071.205 KHz in the example) to be logged for the QSO.

Step 2.
But wait a minute. We are using a computer here, so why can't it do the arithmetic? MixW will do the arithmetic for you if you give it the information it needs. First select View | Spectrum | RF, USB to tell MixW you are using USB. Then select View | CAT bar. I know you don't have CAT, but this is how you tell MixW what frequency your transceiver dial is set to. Then click in the Fq: box, in the CAT Bar, type in the DIAL frequency from your transceiver (14070), and hit the enter key.

Now your waterfall should show the RF frequencies across the top, and you can see exactly what the center frequency of any signal is. Also, MixW will enter the frequency of the QSO properly into the Log as the center of the RF frequency. In the following illustration you can see that MixW entered 14070.882 KHz into the log.
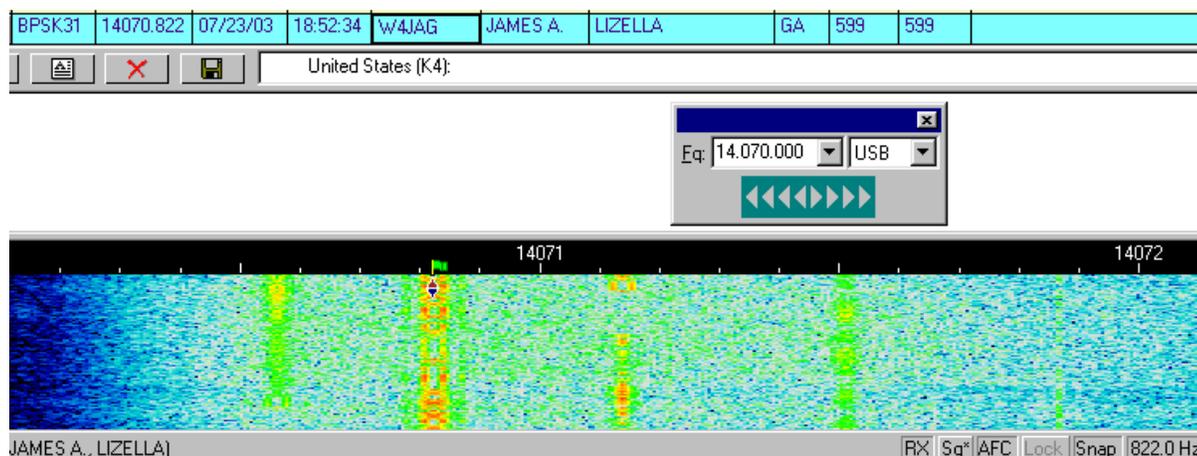
Sometimes it is necessary to reselect the mode (BPSK31 in this example) to get the proper frequency in the log.

NOTE: Every time you change your transceiver dial you must tell MixW what the new frequency is by typing it into the CAT Bar. I recommend, therefore, that you keep the CAT bar on the screen even though you are not using CAT.

Step 3.
There is one more aspect of frequency and sideband choice that you need to know about. Up there in Step 1 you were told that you should always use USB for the soundcard digital modes, regardless of the band you are using. That probably bothered you a little, because you know that when operating SSB you use LSB for 160 - 40 meters, and USB for the others. You may also remember, if you have been a ham for a while, that in the past RTTY normally used LSB.

You are remembering correctly, but things have changed with modern transceivers and the use of computer programs and soundcards for the digital modes, including RTTY. Again, MixW will take care of most cases for you if you give it the information it needs, which you have already done in Step 2. Here is what a RTTY signal looks like in MixW. Note that the center of the transmitted signal (the green flag), 14085.275 KHz is shown in the log entry. The transceiver is set to 14084 KHz, and USB.

Inversion
 When using a traditional hardware TNC, RTTY is almost always operated in the LSB mode, utilizing a 170 Hz shift between the MARK and SPACE tones, with the MARK tone being the higher in frequency. If MixW is set on "RF, LSB" it will set the Mark tone as the higher tone. However, if MixW is set on "RF, USB" then the Mark tone will be set to the lower tone. (You can **think of this as an automatic inversion** if you like). In other words, if MixW is configured correctly (it needs to know if you are using LSB or USB) then it will automatically adjust your Mark and Space tones for you.

Note: This feature works differently in MixW than most other SoundCard digital programs so it may be confusing at first. Other modes that utilize the inversion feature are QPSK31, MFSK16, AMTOR, Hellschreiber, THROB, and FAX. **In MixW, "Inverted" means to invert the Mark and Space tones from the normal operating standards of the active mode**. If you are tuned to a strong signal, but copying only garbage, try opening the Mode Settings Dialog and clicking the Inverted box to see if the signal can be copied in the inverted mode.

Step 4.
Now for the big step. Once you have experimented with MixW by working a few QSOs you should go to the Operation Section and read the General Operation Topic all the way through. You may not understand some of it the first time through, but it will ring a bell later on when you are trying out all the great features in MixW.