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How to obtain 101Cats

101Cats is a free application distributed under a BSD style licence which permits anyone to take a copy for their own use and to redistribute freely. The licence terms of 101Cats forbid its sale at a profit - although the cost of enforcement means that it is unlikely that this would be actively chased. The latest official release, together with earlier releases is available for download from this website using the links below. This is, undoubtedly, the safest source.

> **101Cats is a Windows program.**
>
> 101Cats is specifically a Windows program. It is unlikely to run well, if at all, under emulators such as Wine hosted in other operating systems.

Before you start

101Cats is not particularly demanding of the computer on which it is running. Any PC that is capable of reasonable performance in Windows should be sufficient. For a long time, the author ran it very successfully on an AMD Radeon 5600 with 16Gb of memory and it has demonstrably worked well on less powerful machines.

101Cats was developed under Windows 10 and the development now continues under Windows 11. It should also work well under Windows 8. It has not been tested under earlier versions of Windows and successful operation is unlikely.

Downloading 101Cats.

Download a copy of the installation image using the links below. This will download a file with a name of the form "setup *n.n.n.n* .zip" where *n.n.n.n* is the version number. Unzip the contents of this file into a temporary directory and you should see two files:

- setup.exe
- Setup2.msi

Execute **setup.exe** to start the installation process and follow the instructions below.

101Cats is a program that is not widely used and this can trigger false positive warnings from some virus scanning software. The author takes care to keep his development system clean and runs Norton Anti-virus on it at all times. If your anti-virus software flags a warning at any point during the download and installation process, review the details of the warning message. It will probably be a "reputation" type of warning which is saying that this is a rarely seen program and should be regarded with some suspicion.

Downloads

The current released version of 101Cats is V1.0.9.11 and you can download it via this

Previous versions are available as follows

Installing 101Cats

When you run **setup.exe**, you will be presented with a fairly standard Windows installation program. If the PC already has a version installed, then that version will first be uninstalled. *If there is an existing installation that has been fully configured, that configuration will not be lost. See the notes in the configuration section for information on how to backup your configuration.*

There are currently no installation options for 101Cats apart from the installation directory. Configuration files are not stored in the program directory, so it can be left in the Windows default location.

When the installation is complete, you can proceed to perform an initial configuration following the instructions below. (Configuring 101Cats)

Release notes

V1.0.9.9

- Added initial attempt at Macro Buttons
- Implemented Voicemeeter mute strips on transmit
- Double click on Voicemeeter slider sets gain to 0dB

The "Macros" button bottom/centre of the main window opens up the macros window. This is divided into a 5x5 grid of buttons that can be programmed up with macro commands. Initially, all buttons are programmed as undefined with a caption of "N/A". You program a button by right clicking on it and selecting "Edit" from the context menu. For each button, you can specify the background and foreground colours and the command that it will trigger.

You enter the macro button colours as text strings - things like "Red", "Green", "LightBlue" - I will get round to making that a combo-box in a future release. The range of available colours is wide and you will be warned if you choose an unrecognised colour - experiment.

The macro definition is a string of one or more CAT commands. For example "FA007074000;MD0C;" will get you ready to run FT8 on 40m. Work out the string with reference to the CAT manual from Yaesu. Alternatively, open the "Trace Window" with the TW button, make your settings with the 101Cats controls and observe the commands sent to the radio in the right hand list box.

The "Save" button lower-left on the Macros window writes the current macro definitions to an XML file called "Macros.xml" - this will be in the directory "G8FXC\101Cats" within your Documents directory.

This is an early release of macros and will be enhanced in the future - feel free to ping me suggestions by email.

V1.0.9.10

- bugfix of 1.0.9.9 - removed XSD validation because I got the XSD file wrong

v1.0.9.11

- further bugfix - bandplan configuration working properly

Wiki

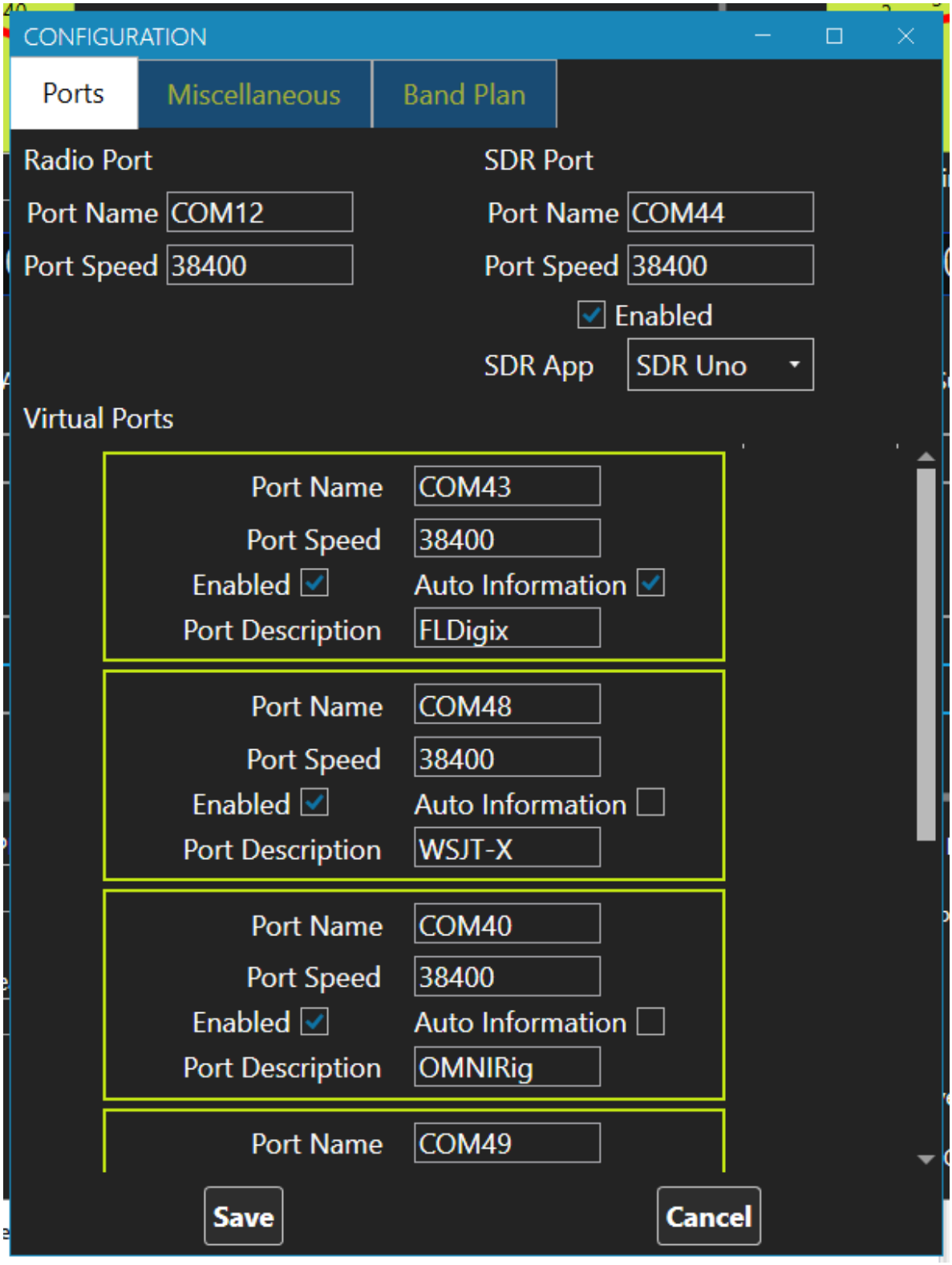
There is still little formal documentation for 101Cats, but this Wiki contains a selection of basic instructions, tips and observations.

Configuring 101Cats

101Cats is configured via the file **config.xml** which is stored within your *AppData\Roaming* directory. If your Windows user ID is Fred, then the path to this file will typically be *C:\Users\Fred\AppData\Roaming\G8FXC\101Cats\config.xml*. **N.B. the AppData directory is usually set to be hidden which means that you will not be able to see it in the Windows File Explorer. In order to see the configuration file and edit it, you will probably have to turn on *Show|Hidden Items* from the View menu.**

Note also that there will be two copies of **config.xml** on your PC - it is important to ensure that you edit the correct one. When you install 101Cats, a copy of **config.xml** is included in the program directory. This is an initial template (actually based on the configuration on my PC). When you run 101Cats for the first time, this configuration file is copied from the program directory to a subdirectory created under the AppData directory as described above. This then becomes the live configuration file that is referenced by the application and is the one that you should edit. If you ever seriously corrupt the live configuration file, you can overwrite it with a copy of the file in the program directory, but you will lose all your local configuration.

Until recently, you needed to edit this file with a suitable text editor in order to change the configuration of 101Cats. I have now started to create a dialogue box to edit this configuration in a controlled manner. It is accessed through the **Configure** link that appears towards the right hand side of the title bar of the main 101Cats window. This configuration screen is currently a work in progress. It is untidy and only covers the more commonly used configuration options. For items that are not currently configurable via the dialogue box, it is still necessary to directly edit **config.xml** with your favorite text editor (I recommend Notepad++). Editing a moderately complex XML file by hand can be error prone, so please take a backup copy of the file before changing it! The configuration dialogue window looks like this:



ConfigDialogue1.png

The config file is only read once when 101Cats is started. If you make changes either through the dialogue box, or directly by editing the XML file, the changes will not be

actioned until 101Cats is reloaded. You can always do this by closing the application and running it again from the Windows start menu. For convenience, there is a **RESTART** button at the bottom right of the 101Cats main window.

Colour themes

101Cats is built using the **MahApps** UI framework which supports Theming. You can choose a theme to suit you by updating the **Theme** entry in **config.xml**. The configuration dialogue box does not currently support this, so you'll have to edit the configuration file manually using your favorite text editor. This must be done with some care - instructions are given here (Configuring 101Cats)

Currently, only MahApps stock themes are supported. A future version may support theme customization. The stock themes are :

"Red", "Green", "Blue", "Purple", "Orange", "Lime", "Emerald", "Teal", "Cyan", "Cobalt", "Indigo", "Violet", "Pink", "Magenta", "Crimson", "Amber", "Yellow", "Brown", "Olive", "Steel", "Mauve", "Taupe", "Sienna"

and these base themes:

"Light", "Dark"

I use the following :

```
<Theme>
    <BaseTheme>Dark.Cyan</BaseTheme>
</Theme>
```

which I find quite readable.

At some point in the future, I'll get round to extending the configuration dialogue box to include theming.

User Interface

101Cats is a Windows program and follows the Windows User Interface conventions fairly closely. The majority of controls are combo-boxes, sliders and toggle switches and operate as you would expect. The intention is that it should be largely mouse driven and sliders should react to mouse clicks, mouse drags and the rotation of the mouse wheel. Surprisingly, none of these interactions come without some programming effort and it is almost certainly the case that I have not implemented the mouse wheel on some of the less frequently used sliders - if you find one, ping me a message and I'll fix it in a future release. Where a slider has a sensible default value, it should respond to a double click by resetting to that value. Try setting the filter shift to some non-zero value, then double clicking it - it will reset back to zero. I have not implemented that on every slider - if you think that it should be present elsewhere, tell me and I'll add it in the future.

The two meter controls are hand-carved code - I could not find any off-the-shelf meter control that I could use at a reasonable price. They were complex to implement and are still not perfect. The scales were determined by inspection and may not accurately reflect the values displayed on the radio front panel - if you find any glaring errors, let me know.

The frequency displays are also hand-carved code. They respond to the mouse wheel which is the primary method of tuning. One digit is highlighted at all times and this is the digit that is varied by the mouse wheel. Clicking on a different digit will select it such that you can choose the tuning rate. You can also use the keyboard to temporarily adjust the tuning rate - hold down the "ctrl" key while you turn the mouse wheel to multiple the tuning rate by ten, the "shift" key multiplies it by 100 and "ctrl" + "shift" multiplies it by 1000. Double clicking in the frequency display rounds it off to the nearest kHz.

You can also enter frequencies by typing them on the keyboard. If 101Cats is the application with focus, typing any digit on the keyboard will open up a data entry window where you can key in an exact frequency. Hitting "enter" will tune to the new frequency.

Other Functions

The column of buttons down the right hand side of the window should be reasonably self-explanatory, but here are a few notes... "TW" opens the "Trace Window" which

displays the data stream to and from the radio. It also allows you to enter CAT commands and send them to the radio. This is intended for me to debug the code - use it with care unless you are sure of what you are doing. It should not be possible to damage the radio through this window, but you certainly could get it into some strange state which is difficult to undo without a reset.

"External Tune" saves the current power level and mode settings, then switches to AM, reduces the power to 10W and puts the radio into transmit. When you release the button, the radio is put back to receive and the previous power and mode are reinstated. In order to avoid tuning up on a frequency that is in use, right clicking this button will QSY up 3kHz before putting out the carrier and QSY back down on release. Obviously, this could result in you shifting to another busy frequency, but the FTdx101 has a good bandscope and it only takes a glance at the screen to know if it is safe to QSY up.

The "Mute" button turns off both receivers. This is a toggle button - clicking it again will restore the receivers to their previous state.

The "To SDR" and "From SDR" buttons transfer the current frequency between 101Cats and an external SDR program such as SDR Uno or SDR Console. I know that both of those programs implement a function to synchronise their tuning with that of an external radio, but this function is limited and did not match my style of operation. There is a more detailed explanation of this on another page of this Wiki.

The "<=>" button swaps frequency and mode between Main and Sub.

The "Internal Tuner" and "Tune" buttons do what they say - turn the internal tuner on/off and initiate a tuning cycle.

The "Zero In" and "CW Spot" buttons also do what they say - only functional with the radio in CW mode.

The "Spectrum" button opens up a second window that displays the radio's spectrum display and allows you to control it. The FTdx101 does not output spectrum data over the USB interface, so this window is only functional if you have the DVI output on the back panel connected to the PC via a video digitizer. This is too complex to describe here and will be the subject of another Wiki page.

The "Keyer Memory" button brings up a dialogue box that roughly matches the functionality of a Yaesu FH-2 keypad. This window needs work - it is functional, but not polished.

The "History" button brings up the "Tuning History" window. This is another "work in progress", but already very useful. You can set a timeout (which defaults to 10 seconds) and, if the radio remains tuned to a frequency for more than this period of time, an entry will be made in the history window. Double clicking an entry in the history list will tune back to that frequency and mode. You can annotate an entry in the history list to remind yourself of what you heard there and you can clear the entire list or individual entries. Gone are the days when you were tuning around, heard an interesting DX station, made a mental note to go back and try to work it, then completely forgot the frequency he was on. It also helps to avoid "finger trouble" as you accidently jog the tuning knob and lose the station you were talking to!

The "DX Cluster" button brings up a window that displays the output of a DX Cluster server. This is very definitely a work-in-progress - it does work, but it has a lot of rough edges. It will be improved significantly in a future release.

Below the buttons, you'll see "APO Time" and "APO Enabled" - these are Automatic Power Off. The box below "APO Enabled" is the count-down - if it gets to zero, the radio is powered off. Any activity in the window will reset the APO Timer.

"SWR Check" turns on a High SWR warning function. If the radio reports a high SWR reading to 101Cats, then it will be forced out of transmit and a warning message box displayed. Note that, during antenna tuning the SWR may go high at times. 101Cats implements a delayon the High SWR warning function - this defaults to 1 second and can be configured via the configuration file.

Below the SWR Check box, there are several static text fields. The top one is the version number of 101Cats. Below that, there are three numeric fields - these are the lengths of various internal data queues and are there to assist with debugging the code. They should idle at zero and never go above four or five. The only exception to this is at startup when there is a lot of interaction between the application and the radio and you may see queue lengths increase significantly.

Speech Processor Controls

The speech processor on the FTdx101 series is more complex than that on many other radios and getting the setting wrong can make the transmission sound bad and, possibly, excessively wide. There are three sliders - "Mic Gain", "Speech Processor" and "AMC" towards the bottom of the 101Cats window that control the speech processor parameters. There is also a toggle switch, "Lock Processor" which disables these

controls. Getting the processor set to match your microphone and operating style can require a significant amount of effort and I wanted to guard against accidentally "jogging" a setting and undoing all my careful work!

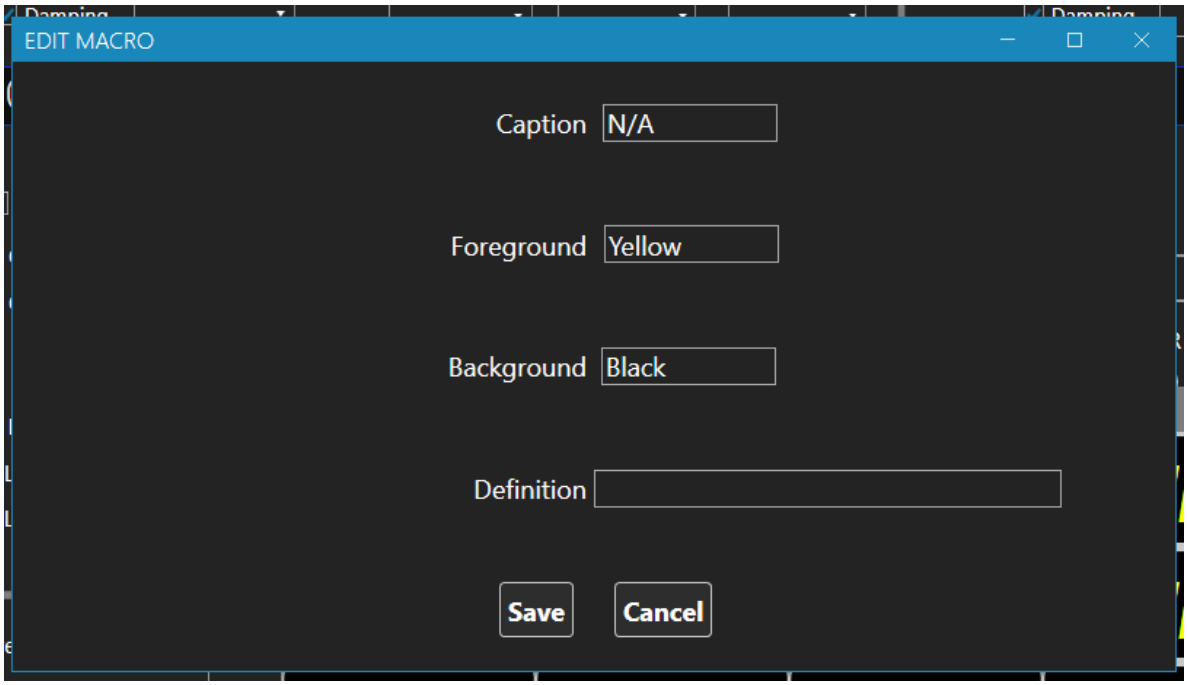
Macros

V1.0.9.9 adds a simple Macro function. The "Macros" button (bottom centre of main screen) opens the Macros Window. This is divided into a 5x5 matrix of buttons that can be programmed to perform user defined tasks. A button is programmed by right clicking on it and selecting "Edit" from the context menu that pops up. In the dialogue box, give the macro a title, enter background and foreground colours for it and give it a definition. Currently, you specify colours as text strings - "Yellow", "Red", "LightBlue" etc. Windows recognises a wide range of colours by name - experiment! If you enter a colour that Windows does not recognise, you will get an error message when you try to save the definition. At some point in the future, I'll put in the effort to change these to combo-boxes in order to simplify the data entry.

MacroWindow.png

The macro definition is currently a string containing one or more CAT commands. For example, the string "FA007074000;MD0C;" will prepare you to run 40m FT8 by tuning to 7.074MHz and switching to DUSB mode. Note that each CAT command must be terminated with a semicolon. You can compose the definition string with reference to the FTdx101 CAT command manual. Alternatively, the Trace Window (opened with the TW button) can help - the right hand list pane displays the commands that are sent to the radio. Perform the functions that you want to program onto the macro button via

the 101Cats main window while observing the Trace Window (but do note that there will be other traffic displayed as well, so don't copy commands blindly, check them back to the CAT command manual if necessary.



MacroDefinition.png

Be careful with the commands you send to the radio - particularly if you are not familiar with driving a radio via CAT commands. It should not be possible to physically damage the radio, but you could get it into a strange state that might require a factory reset!

Using an external SDR as a high resolution panadaptor

OK, so the FTdx101 series of radios has an excellent panadaptor function via the screen on the front panel plus the external screen that can be plugged into the DVI socket on the rear panel. But the screen resolution is only moderate and there are benefits that can be had by connecting an external SDR unit such as an SDRPlay RSP1A. A unit such as this works with an application on the shack PC which processes the output of the SDR, tuning it to the required frequency, demodulating the RF and applying functions such as noise reduction and filtering.

The two leading SDR applications for Windows are SDR Console and SDR Uno. When paired up with a suitable SDR, these can make your PC function as a very nice general coverage receiver spanning frequencies from Long Wave all the way up to microwaves. They also include functions that will allow them to be interfaced to many modern HF transceivers to provide a high resolution panadaptor and/or an additional receiver.

Both SDR Uno and SDR Console include a function to synchronize themselves with an attached transceiver - including an FTdx101D. When this function is enabled, the tuning of the SDR application and the transceiver are locked together - spin the dial of the FTdx101D and the application on the PC will follow the tuned frequency, retune the PC application using the mouse wheel or keyboard and the FTdx101D will follow it.

If all you want is a better panadaptor, then the configuration is simple. Both SDR Console and SDR Uno make use of OmniRig as the interface for this synchronization. You need to install the SDR application of choice, install OmniRig, create a virtual port pair following the instructions here, configure one end of that virtual port pair into 101Cats and the other end into OmniRig. Finally, configure your SDR application to synchronize via OmniRig and it will all work well.

The issue comes if you want to sometimes use the SDR application as an additional independent receiver. Both SDR Console and SDR Uno have buttons on their windows to suspend the synchronization and you can then tune to a different frequency to that to which the FTdx101 is tuned - possibly in a completely different band if your antenna routing will permit it. Again, this works perfectly well - until you want to restore the synchronization. The restoration is just a case of clicking the button on the screen of the SDR application again, but neither SDR Console nor SDR Uno give you any function

to specify which device, the FTdx101 or the SDR application, should be considered the master. It is all a question of timing and cannot be reliably predicted - you have found an interesting signal on either the FTdx101 or the RSP1A and want to listen to it on the other device, but you could easily find the the restored synchronization works in the opposite direction and you lose the frequency of interest.

In order to resolve this, 101Cats introduces a second interface to an external SDR application - the "SDR Port" that is referenced in the configuration screen. You create another virtual port pair, configure one side of that pair into the SDR Port of 101Cats and the other side into the CAT function of SDR Console or SDR Uno. Once you have done this, the two buttons “To SDR” and “From SDR” that appear on the right hand side of the main screen become active. If the synchronization has been turned off, then these buttons allow you to transfer the tuning in either direction in a controlled manner before re-enabling synchronization.

Note that there is a configuration setting which specifies which SDR application is being used. Currently, the only options are SDR Uno and SDR Console. This is a recent addition and not included in the configuration dialogue box - it is necessary to edit the configuration file manually in order to change it. See the pages in this Wiki for instructions on how to do this. The relevant configuration item is the "App" setting \:

```
<SDRPort enable="true">
    <PortName>COM44</PortName>
    <PortSpeed>38400</PortSpeed>
    <App>SDRUNO</App>
</SDRPort>
```

Permissible values are **SDRUNO** and **SDRCONSOLE**.

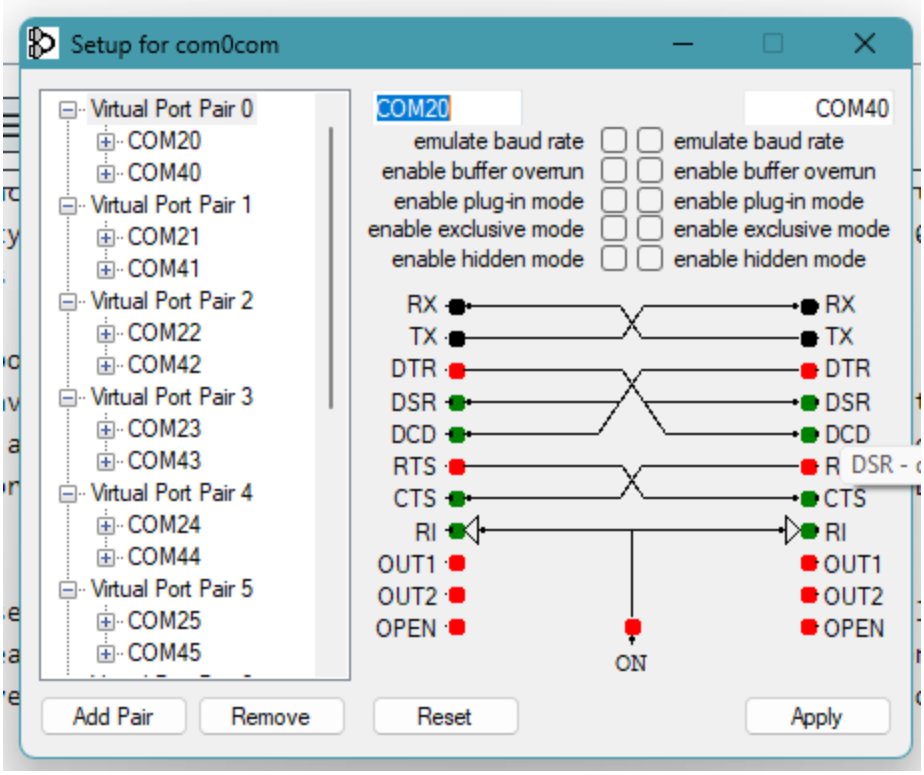
Integrating with third-party applications

101Cats provides good support for integration with third-party applications including log books and digital mode applications such as WSJT-X. As well as controlling the radio itself, 101Cats also functions as a hub to allow multiple third-party applications to connect to the radio. It implements multiple virtual FTdx101s so that each third-party application thinks it has sole control of the radio and 101Cats takes care of routing commands and responses accordingly so that no two applications will block each other.

101Cats makes use of an external virtual serial port driver application in order to establish the interfaces with the third-party applications. There are several virtual serial port driver applications available including com0com (https://sourceforge.net/projects/com0com/), Eltima Virtual Serial Port Driver (https://www.eltima.com/products/vspdxp/) and Eterlogic VIRTUAL SERIAL PORTS EMULATOR (https://eterlogic.com/Products.VSPE.html). Com0com is probably the most widely used - it is free and works well. The others may have more modern user interfaces, but they cost money and don't seem to have any significant benefit over com0com. Note that Windows 11 is more touchy that previous versions about third-party drivers. Com0com is available both signed and unsigned - you probably want to install the unsigned version with Windows 11.

Once you have chosen and installed your virtual serial port framework, you will have to create virtual serial port pairs to support the third-party applications that you wish to connect. Think of each virtual serial port pair as a virtual cable that can connect two applications together. You will need as many virtual serial port pairs as you have third-party applications to connect (actually, this may not be strictly true if you use Omnirig - see below).

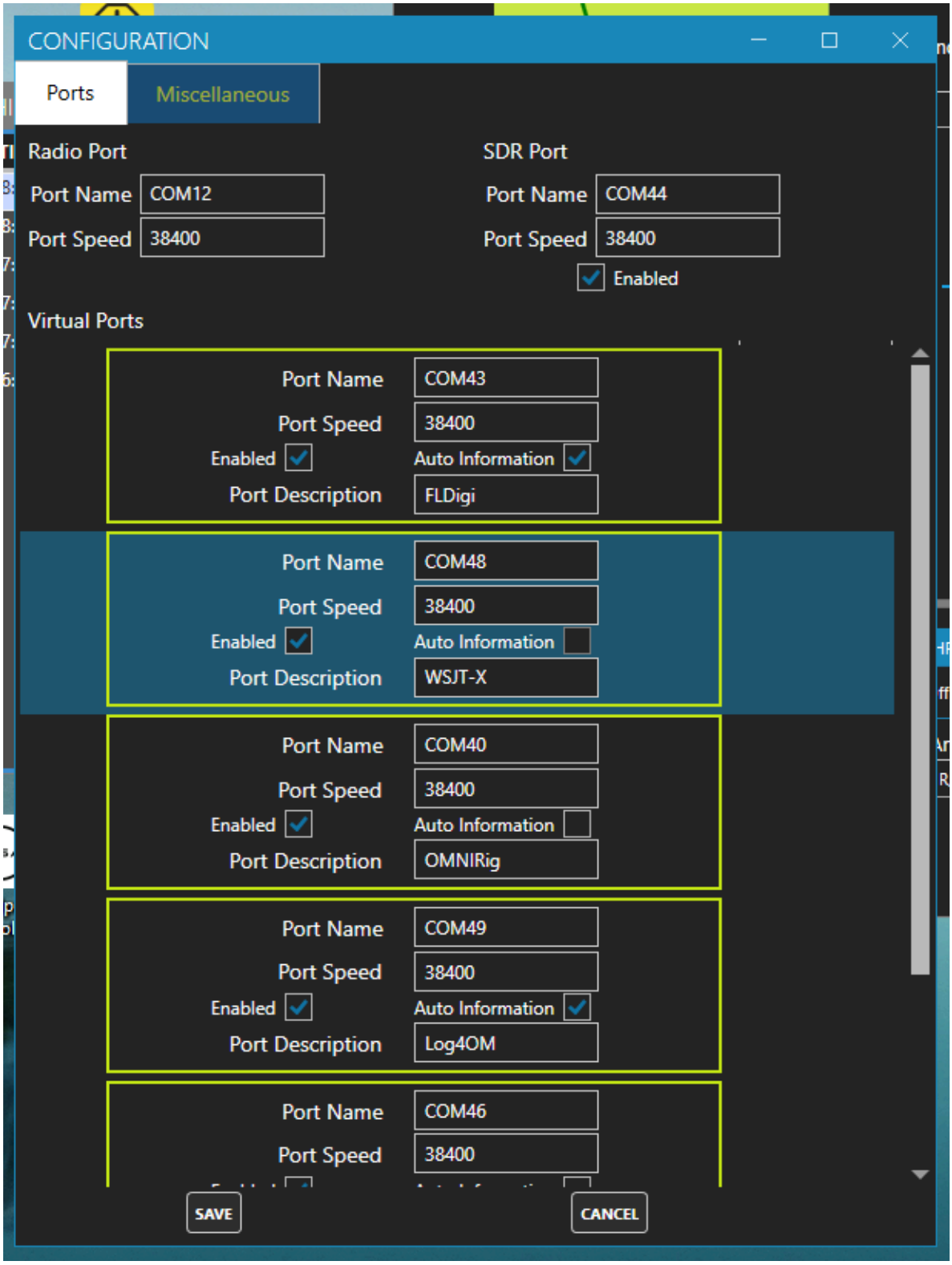
I use Com0com and the screenshot below shows my configuration:



image

If you are creating multiple port-pairs, it can become difficult to keep track of them. Adopt a numbering scheme which makes it easy to remember the two ends of a port pair - in my example, the port numbers at each end differ by 20. If you are using com0com, you probably don't need to change any of the port parameters from their default settings.

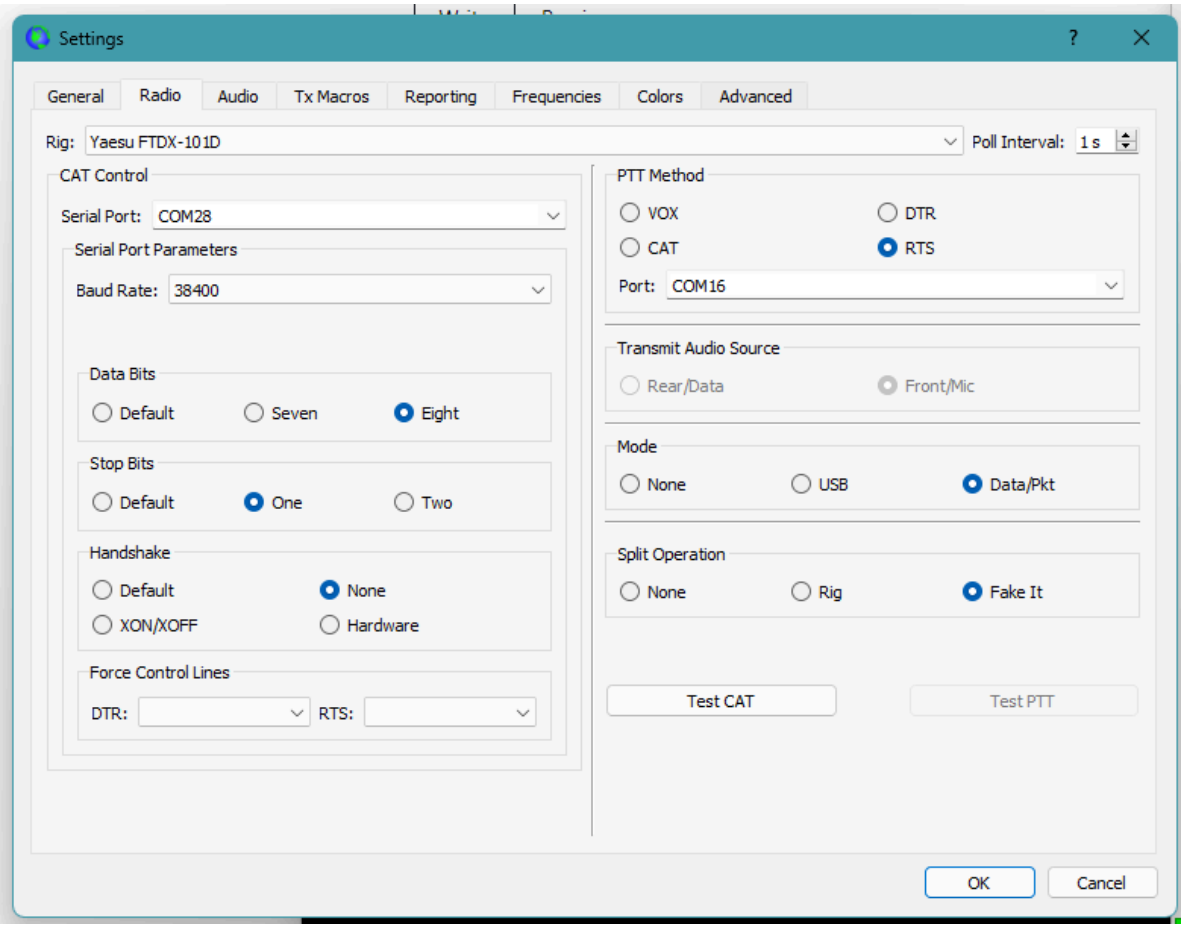
Once you have created the port pairs, you need to configure one end of each of them into 101Cats. You can do this through the configuration dialogue box of 101Cats as shown below. Note that the configuration dialogue box does not currently include functionality to add or remove ports from the configuration. The standard configuration file includes six port entries and you can update these to suit your requirements. If you don't need all six, mark some of them as not enabled. If you need more than six, you'll have to manually edit the **config.xml** file.



image

Note that each virtual port configured into 101Cats is one end of a virtual serial port pair - the other end will be used by the corresponding application. In my example, port

COM48 is configured for WSJT-X. Under my chosen numbering scheme, COM48 is one end of a pair with COM28 - hence the configuration of WSJT-X on my PC is:



image

You'll need to determine the **Auto Information** setting by trial and error in most cases. Auto Information is a function of the FTdx101 which can be turned on and off by the application - when it is on, the radio sends a continuous stream of status messages to the application, avoiding the need for the application to poll repeatedly for data. 101Cats is able to replicate the Auto Information stream out to each third-party application but doing so unnecessarily will increase the load on your PC, so try disabling it and checking if the application still works. Auto Information is controllable on a per application basis.

Omnirig

To Be Completed

Additional Hardware

101Cats is designed to work with several different external devices that can enhance its operation. These are briefly described here. More detailed documentation will be added in the future - if you are in a hurry to try any of these, post a message on the Discussions board requesting additional information.

An external SDR

The FTdx101 has good support for an external SDR connected to one of the RF outputs on the rear panel. 101Cats builds on this by offering functionality to interface to a third-party SDR application running on the same PC so that they cooperate. The author uses an SDRPlay RSP1A receiver with the SDR Console application. 101Cats has also interfaced successfully to the SDRUno application offered by SDRPlay although this has not been tested recently. If you try this and find that it does not work, raise it as an issue and it will be fixed.

The configuration of 101Cats and SDR Console is too complex to describe here - a separate page will be added to the Wiki shortly. Once it is configured at both ends, the **To SDR** and **From SDR** buttons to the right of the main window become active and will support the synchronization of frequency in either direction. If you enable **Tracking** in SDR Console, then the two applications remain synchronized automatically and you can tune the FTdx101 by clicking in the SDR Console spectrum display.

An external video digitizer.

The FTdx101 has a video output on the back panel which will drive an external monitor to give you a larger display. It works well enough, but represents a significant investment and occupies quite a lot of space in the shack. You can buy a cheap USB video digitizer through Amazon (and other web retail sources) for around $20 which will allow 101Cats to capture the video output from the radio and display it in a movable and realizable window on your PC screen.

101Cats will allow you to tune the radio by pointing into the waterfall display in this window and clicking with your mouse. An example of the display is shown below ::

two

A Contour Shuttle tuning wheel

Contour Design manufacture multi-media controllers (https://contour-design.co.uk/collections/multimedia-controller) which 101Cats supports as dedicated tuning knobs.

image

The Contour Multimedia Controller Xpress has five buttons, a "jog dial" and a digitizer wheel. 101Cats uses these to tune and control the radio in a natural manner comparable with the front panel controls. The Multimedia Controller PRO v2 has additional buttons

that could be programmed to perform other tasks - though this would require additional code in 101Cats.

Antenna 3 function notes.

101Cats includes a combo-box for each receiver to select the antenna configuration. The options available are **Ant 1**, **Ant 2**, and a third which is dependent on the configuration selected in the **Operation Setting** menu under **ANT3 Select**. Recent versions of 101Cats have included a combo-box named **Antenna 3 Function**, but this has omitted one supported option, **TRX**. This is now implemented, but subject to some controls that are described below.

The Antenna 3 socket on the FTdx101 series can be configured in several ways. These include options to connect an active receive antenna to it in order to reduce QRM/QRN. It can also be configured as a third transmit antenna. The problem with this is that if you connect an active antenna but configure the antenna 3 socket as a general purpose TX/RX socket and select it, the next time you transmit, you will push 100W of RF into the pre-amplifier of your receive antenna and almost certainly destroy it.

In order to address this, I've added a pair of configuration items to 101Cats. These are **Antenna3 Permit TX** and **Antenna 3 Warn TX**. They have been added to the configuration dialogue box. By default, they are both disabled. If **Permit TX** is enabled, then the **TRX** option in the **Antenna 3 Function** combo-box is enabled and you will be able to select it. This will, in turn, make the third option in the **Antenna** combo-boxes **Ant 3**. Setting the radio in this way will result in power being output on the antenna 3 socket.

If you turn on **Antenna3 Permit TX**, then the **Antenna 3 Warn TX** configuration option will be taken into account. Under these circumstances, the **TRX** option in **Antenna 3 Function** will become enabled and selecting it will enable the **Ant 3** setting in the **Antenna** combo-box. But with the **Antenna 3 Warn TX** option turned on, each time you select **Ant 3** as the antenna, you will be presented with a modal message box warning that this configuration could result in damaging an external receiver.