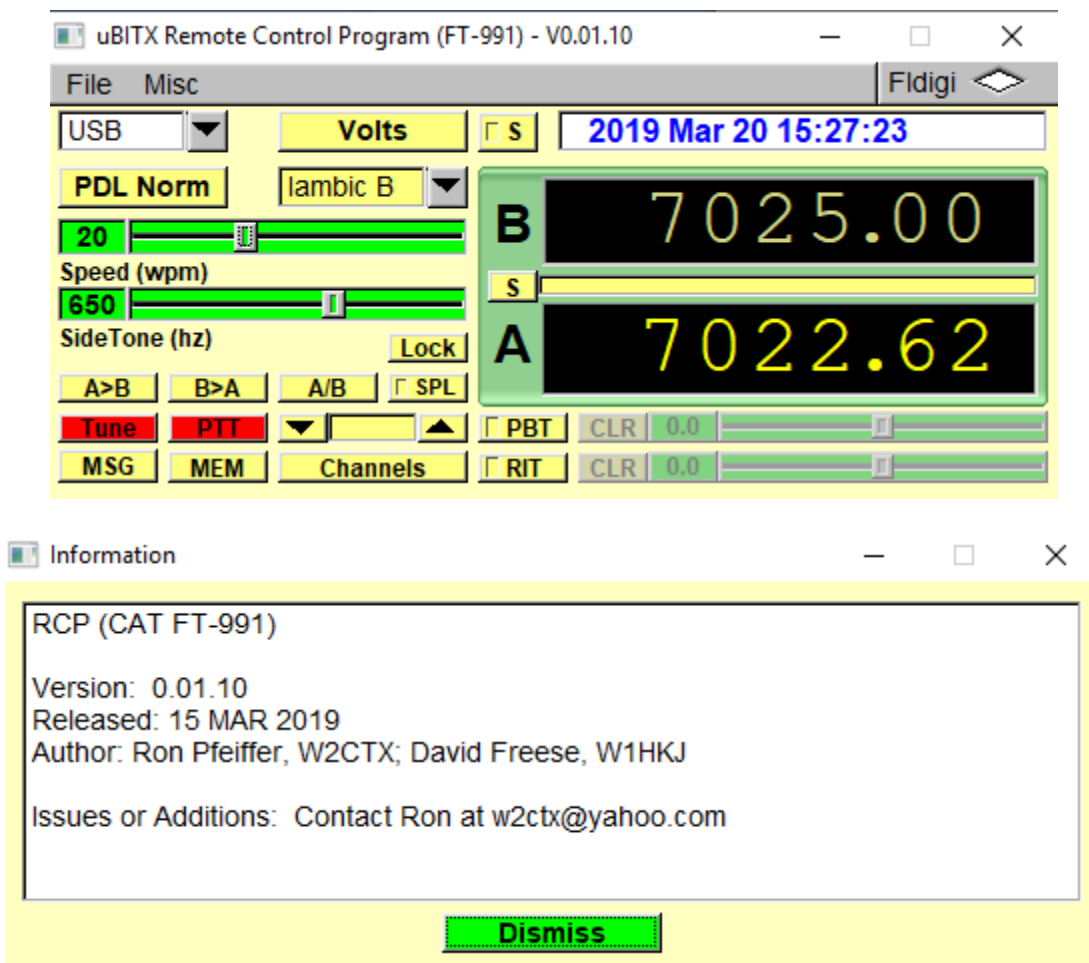# Remote Control Program for the uBITX Transceiver Using Yaesu FT-991A™ CAT Commands

Requires W2CTX RCP (CAT FT-991) Version 0.01.10 (ubitx991CAT_rcp.exe) or later

Manual written by Jim Sheldon, W0EB

Introduction:

Almost all modern Amateur Radio transceivers have the ability to be remotely controlled through a PC's serial or USB ports and most front panel functions of the transceiver can be operated through a specially designed program on some sort of an external computer (or in some cases a dedicated external control panel).

When the team of W0EB, W2CTX and N5IB (which we playfully called the "Triumvirate Skonk Worx") began implementing our own innovations for operation and control of the recently released Micro BITX (abbreviated uBITX) transceiver by Ashhar Farhan, VU2ESE, and released for sale by his company HF Signals out of Hyderabad, India, we did so for our own pleasure and benefit. These innovations and the resulting software went through a few growing pains like all projects of this nature always do but they turned out to function extremely well, especially in the latest versions so we decided to share them with the uBITX community and with the public as well.

We originally used a sub-set of the Kenwood TS-550™ command set, but most other programmers for some reason adopted the Yaesu FT-817™ and later the Yaesu FT-991™ CAT protocol so here's a newer version that uses the Yaesu protocol to allow compatibility with other programmers' software and still be able to provide a "Remote Control" program that will allow CAT control of our versions of the uBITX hardware and software. If they follow the same protocols, it should work with the other programmers' software as well.

This program needs no installer and you can put it in any directory on your computer you like. We recommend putting it in a directory by itself (name

that directory whatever you want) rather than just leaving it on the desk top as it does write several files for frequency and CW message memories that are usually hidden by the Windows system's protocol since they are initialization files for this program and normally don't show up in a directory listing unless the "Show Hidden Files" check box in the directory's "Properties" menu is checked.

To install it, you have to create a directory and move this file into it as there is no installer program. The program, "ubitx991CAT_rcp.exe" does not install into the Windows Registry so if you need to uninstall it for some reason, simply delete the entire directory you placed it in. (That's why we recommend putting it in its own directory. If needed, you can uninstall the program and all files it creates by simply deleting that directory.)

Once you have "ubitx991CAT_rcp.exe" located in its own directory on your computer, you should create a shortcut on your desktop, making it easier to locate and run it.
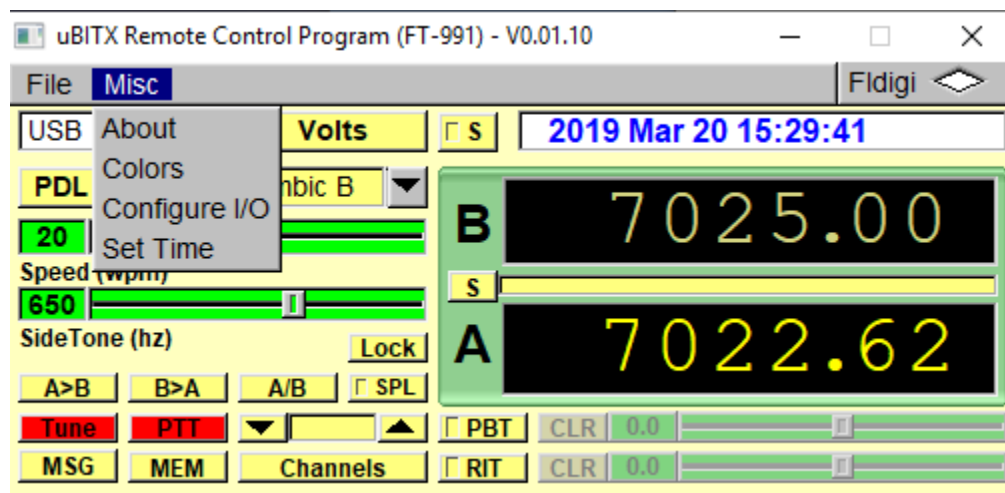
Now that you have the remote control program in its own directory, hook up the USB cable from your computer to the NANO (or other processor if utilized) via the MINI (or MICRO) B connector on the processor. Determine which COM port is being used (you should write down the one that shows up in the Arduino IDE when you program your NANO or other MPU). The program's serial baud rate is fixed at 38400 baud and right now this is not changeable so make sure the software in your uBITX is set to 38400 baud as well or, of course the program won't be able to communicate with the radio. (Instructions to set this parameter should be contained in the instructions for whichever software version you are using so it's not

covered here. It may vary slightly within versions of the versions of the uBITX firmware regardless of which programmer provided it.)
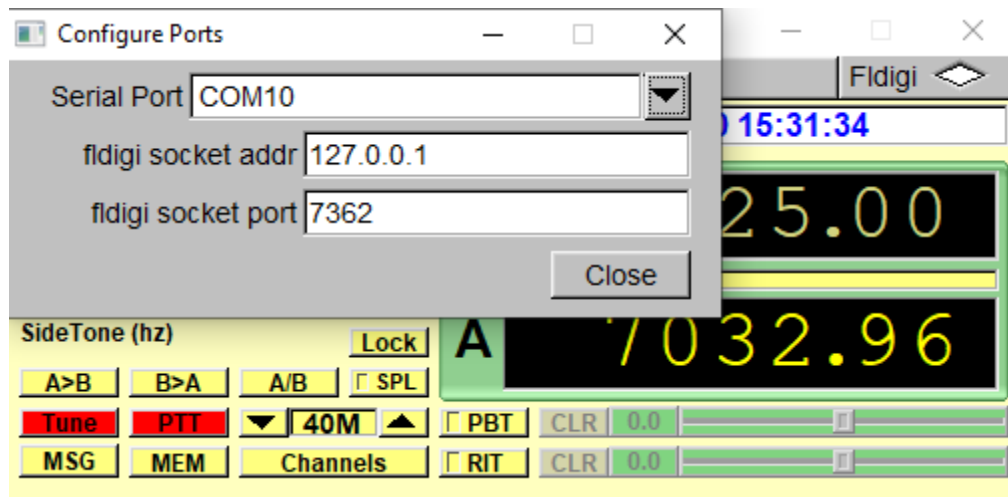
Turn the radio on with the USB cable connected to both the uBITX and your computer's USB port before you start this program.

The first time you run it the communications port will not be selected and after about 10 seconds the "Configure Ports" window is displayed. Select the appropriate COM port. Connection should occur within 5-6 seconds.
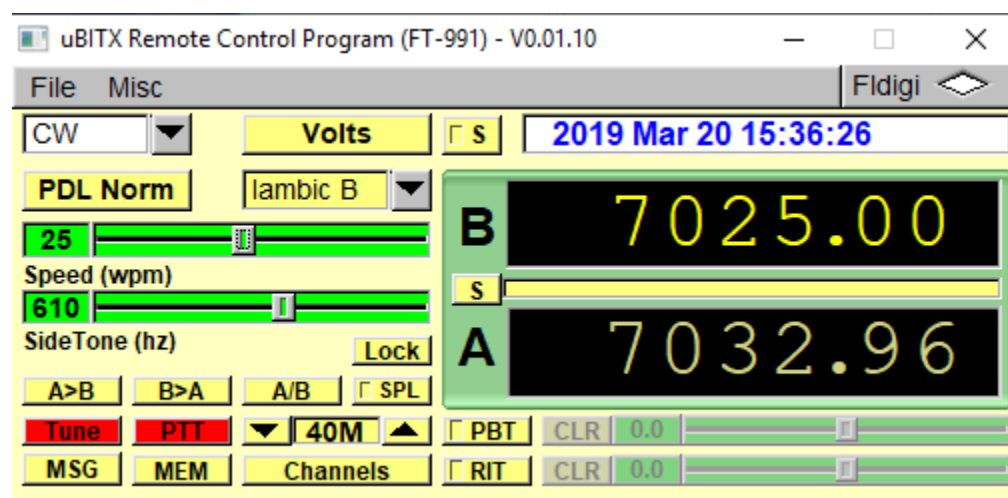
To manually change the COM port, do the following:

Click on Misc and then click on Configure I/O which will bring up the dialog box where you will see COM ports listed. The COM Port that your uBITX is connected to should appear in the list. Click on it and click the CLOSE button that will appear at the bottom of the list once the port is selected.

Once the connection is made between the program and your uBITX (may take several tries the first time you connect to get everything set right) you should see the following window on your screen.
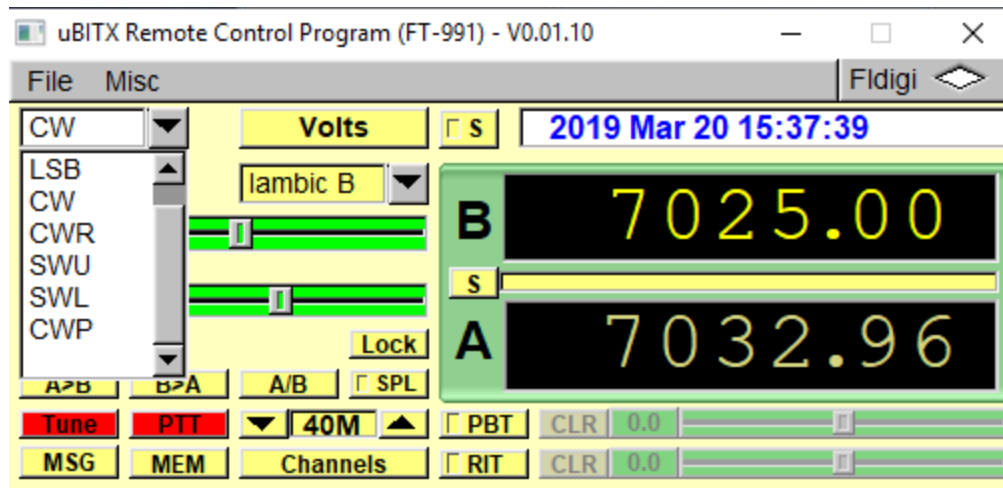

This is your main control window and from here all available functions can be operated. Everything is pretty self-explanatory and you should play with the features to get used to them – CAUTION! The red PTT and TUNE buttons WILL place the uBITX in transmit so while becoming familiar with the program, the radio should be connected to a resonant antenna or preferably a dummy load to prevent damage if either of these buttons is clicked!

Both the A and B VFO frequencies are displayed. The active VFO is indicated by slightly brighter frequency digits and the non-selected one is indicated by dimmed digits. Select either VFO by clicking on the A or B letter to the left of the frequency window. The digits in the selected window will become brighter while the non-selected ones will dim.
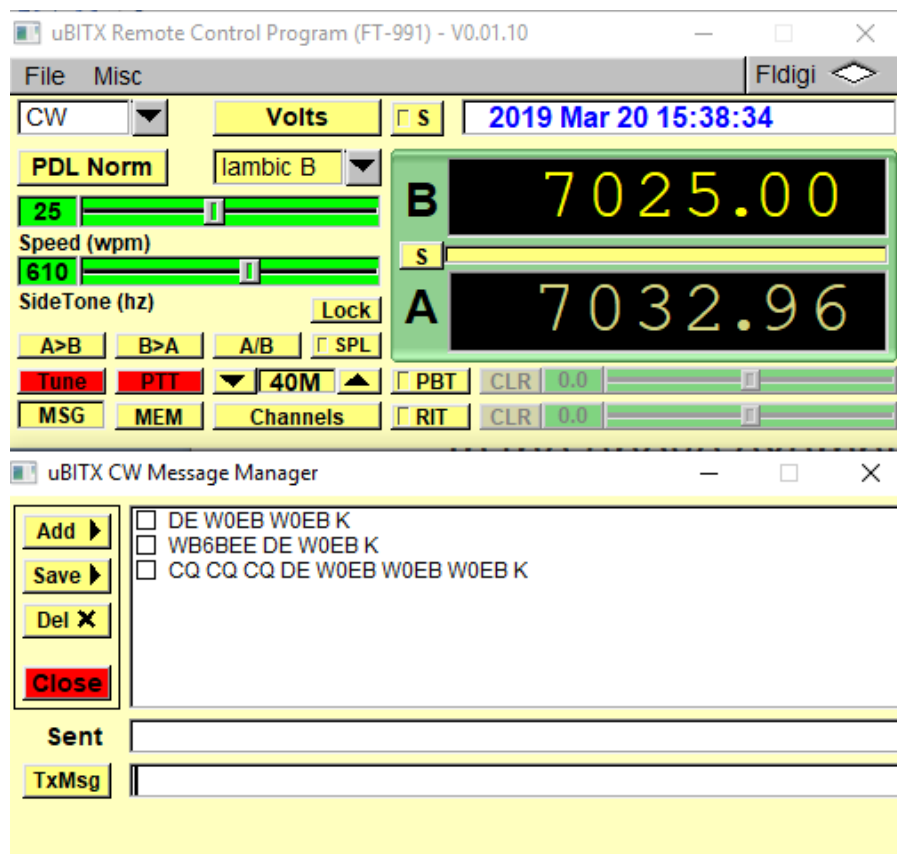
You can tune the radio by placing your mouse cursor near the top or bottom of any digit and clicking the left button will increase that digit by one if near the top of the digit or decreasing it by one if near the bottom of the digit. You can also tune by placing the mouse anywhere in the digit and use the mouse wheel to scroll up or down. (The encoder and frequency increment on the radio are still active though the menu system is disabled during remote control operation to prevent accidental conflicting commands.)

The operating modes are USB, LSB, CW, CWR, SWU,SWL and CWP. USB, LSB and CW are self explanatory. CWR is CW but receiving on the opposite sideband (Default is LSB). SWU and SWR are for short wave listening and select either USB or LSB for that mode and while these modes are active the transmitter is inhibited to prevent accidentally transmitting on the non-amateur frequencies. The last mode is CWP (CW Practice) and this mode also inhibits the transmitter so, if desired, one can practice sending CW with either the paddles or hand key without causing interference on whatever frequency to which the uBITX is tuned.

They are selected from the pull down mode menu and when you click on one to select it, the uBITX will change to that mode.
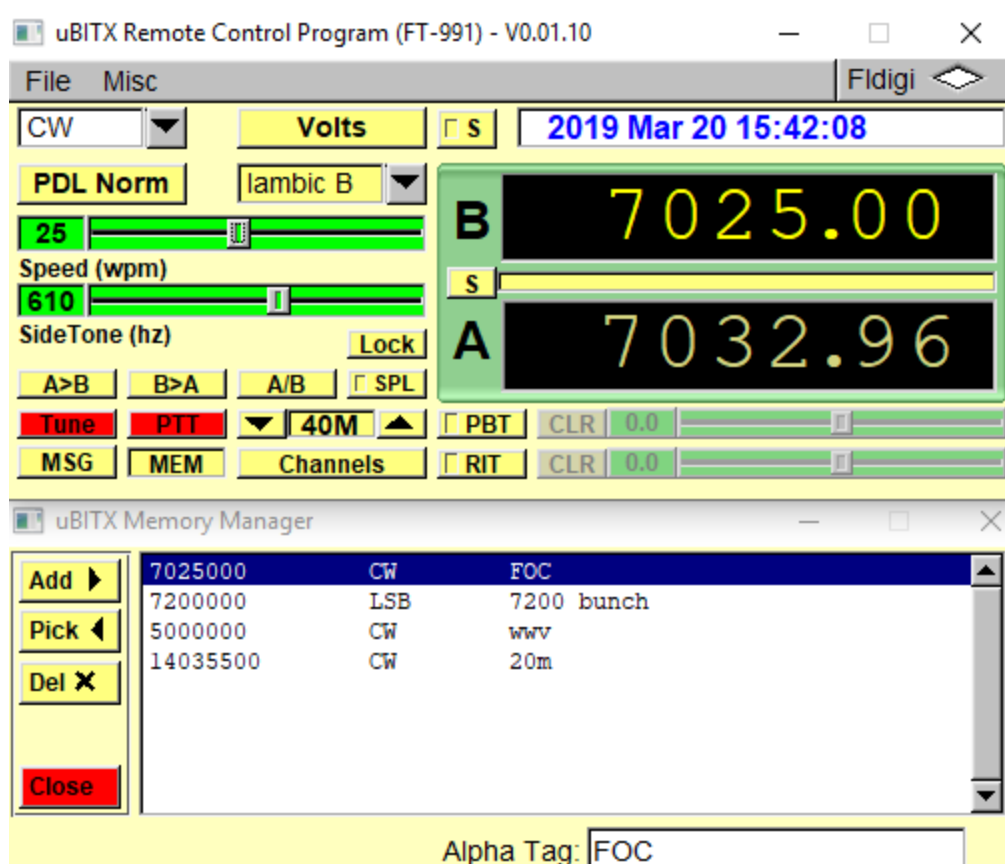
In CW and CWR modes, you have a "Message" memory function that can be accessed by clicking on the Message button which will bring up a special dialog box where you can enter, select and send short messages on CW (there is no capability for voice recording so this only works on CW).

In the above example, you see 3 messages, each with a square "check box" next to them. To enter a new message, type the new message in the bottom box next to the TxMsg button. Then click on the Add> button. Your message can't exceed 255 characters and remember it has to be transmitted at your current Keyer speed.

If you want to send a message but not save it then just type the message into the same line as above but end it with the <ENTER> key and it will automatically be sent as long as you are in one of the CW modes (including CWP). What was sent will appear in the "Sent" window line. To delete a saved message, left click on the check box next to that message and then click on the Del X button. When finished with message operation, click on the red close box and the message dialog window will close, returning you to the main control display again (you can hold the left mouse key down and pull any of the large dialog windows to whatever position you want them on your screen.

The "Memory" button opens a dialog window where you can set frequency and mode memories for later recall and you can recall them easily into either the A or B VFO depending on which VFO is selected as active on the main screen. Add>, Pick< and Del X buttons work similarly to the message memory window. Set the frequency and mode in the main display. Open the Memory dialog and click the Add> button – that frequency and mode will be added (if you want to name the memory, type the name in the "Alpha Tag" box at the bottom of the screen before clicking add and that's all there is to it.
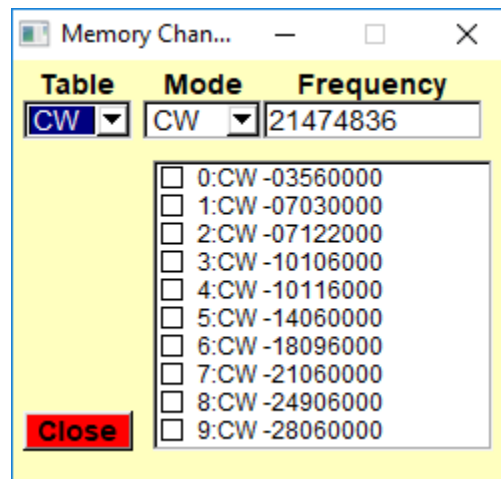
To recall a memory to a particular VFO (A or B) first make that VFO active on the main screen. Open the Memory box, click on the line containing the frequency/mode you want in that VFO and click on the Pick< button. You can also just double-click on the line containing the frequency/mode you want and it will be entered into the selected VFO.
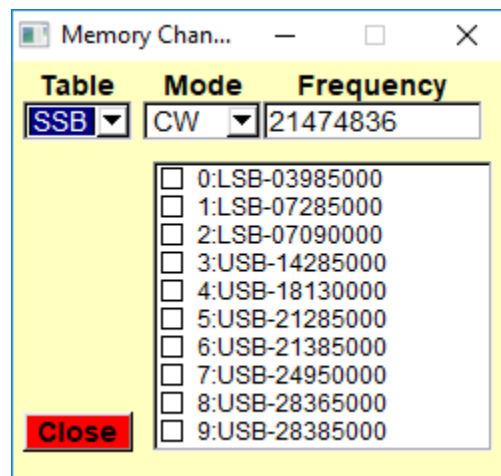
To delete a memory, click on the line to be deleted and then click on the Del X button. That's all there is to it.

In addition to the MEM button a Memory Channel and Bank select button has been added that adds quite a bit of versatility to this program. If you click on the "Ch" button, it opens up a dialog box that will allow you to select between 3 pre-loaded memory banks and one user defined memory bank of 10 channels each (more may be added later). The banks are
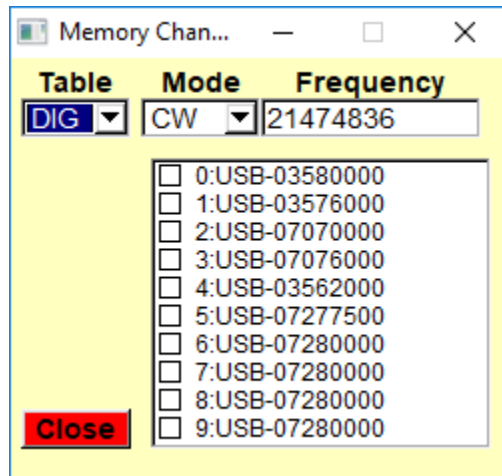
named CW, SSB, DIG and USR. Frequencies and modes contained within the various banks can be easily edited from within the RCP.
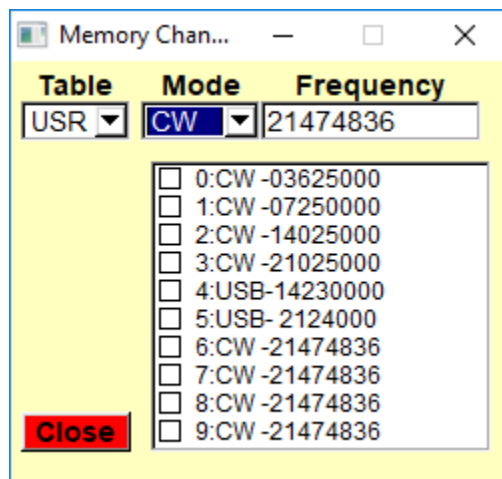

The CW bank comes pre-loaded with the QRP CW calling frequencies for the various bands.

The SSB memory band (even though it shows CW in the mode window and a weird frequency) contains the SSB QRP calling frequencies for the various bands.
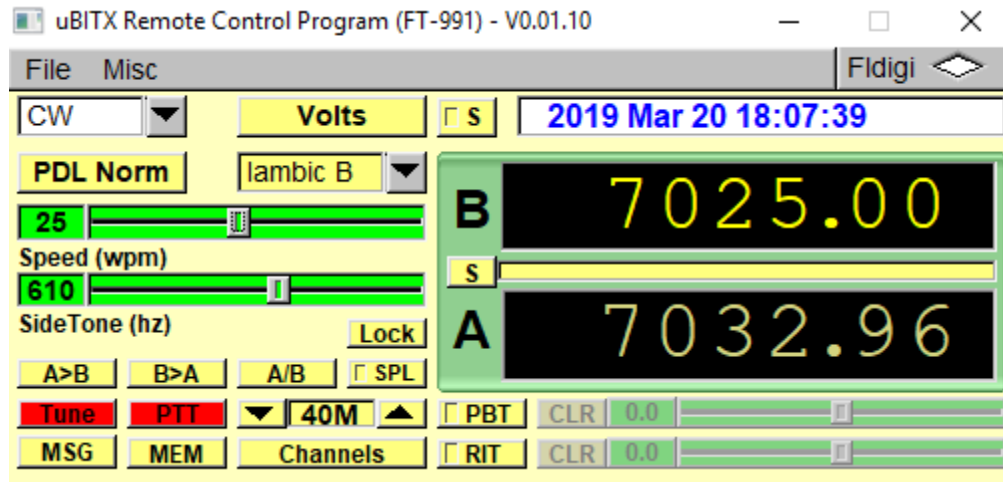
The Digital bank contains the standard Digital calling frequencies for the various bands
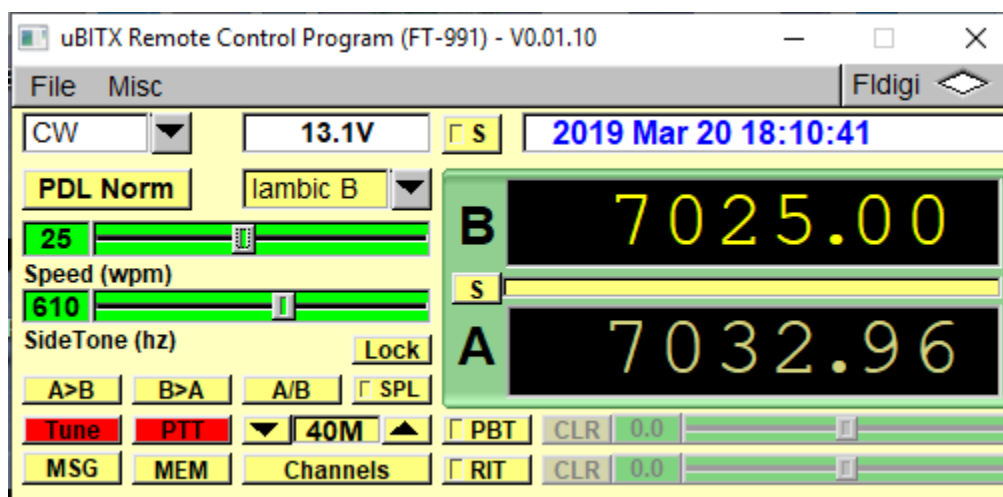

The User bank in this picture shows the way W0EB has his user bank configured.
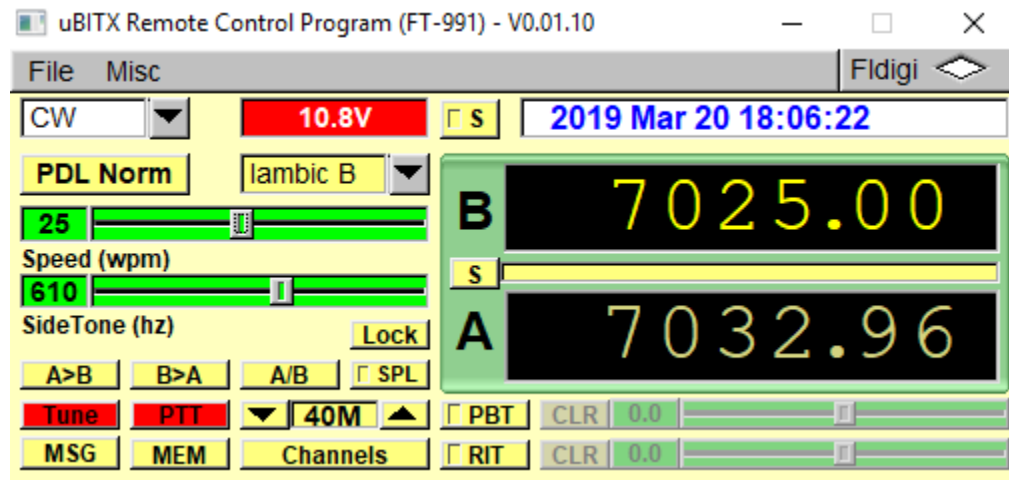
To change Mode, Frequency or both in a given table, click on the check box next to the memory channel you wish to change then click on mode which changes to whichever mode (CW, USB, LSB, SWU or SWL) you want for that channel. Type in the frequency (no decimal point and a leading zero below 10 MHz), hit enter and that memory location is updated to the new mode and frequency. Click on "Close" to close the window.
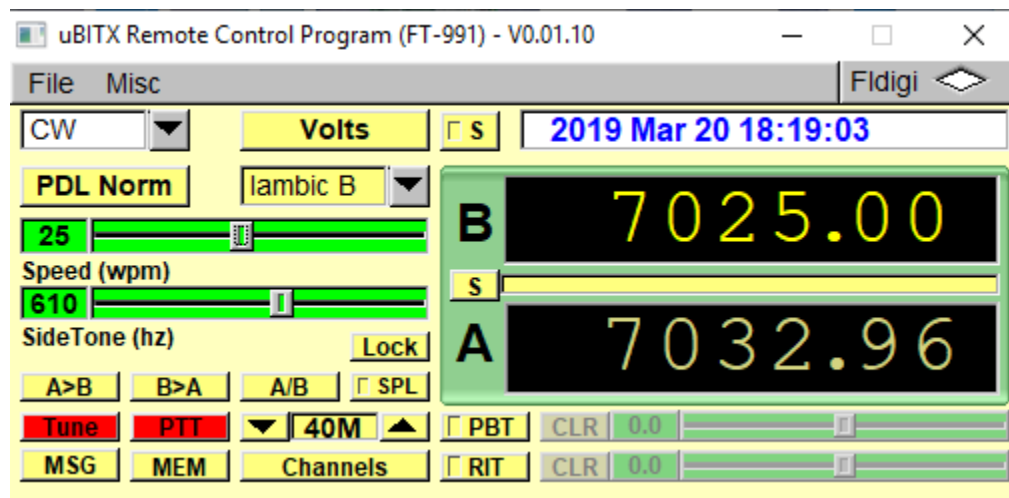
The "Volts" button is sort of a special case. It only works with our RadI2Cino and newer cards that have an added voltage divider connected to the A6 analog input and is used to monitor the incoming +12 Volt power so when on battery you can see when you need to change or charge your battery. The voltage monitor can be turned on or off in one of the uBITX firmware's menus and if it is turned OFF, clicking on the RCP's "Volts" button will have no effect and it will not do anything. If the Voltage monitor is turned ON and properly calibrated via the uBITX's menu, the display will be similar to that in the below picture.

If the voltage falls below 11.0 volts (i.e. 10.9), the voltage gauge changes to RED indicating the battery may be damaged if you discharge it below that mark.

The next couple of functions pertain to the CW keyer and how your key paddles work. The window showing (currently) Iambic B is a small pull-down and you can switch the keyer type to either Iambic mode A or B just by clicking on it here. The Pdl Norm button will change to green when pressed and the dot/dash paddles will be reversed.

Clicking the button again will put it back to what most people call "normal" with the dots on the left paddle, dashes on the right.
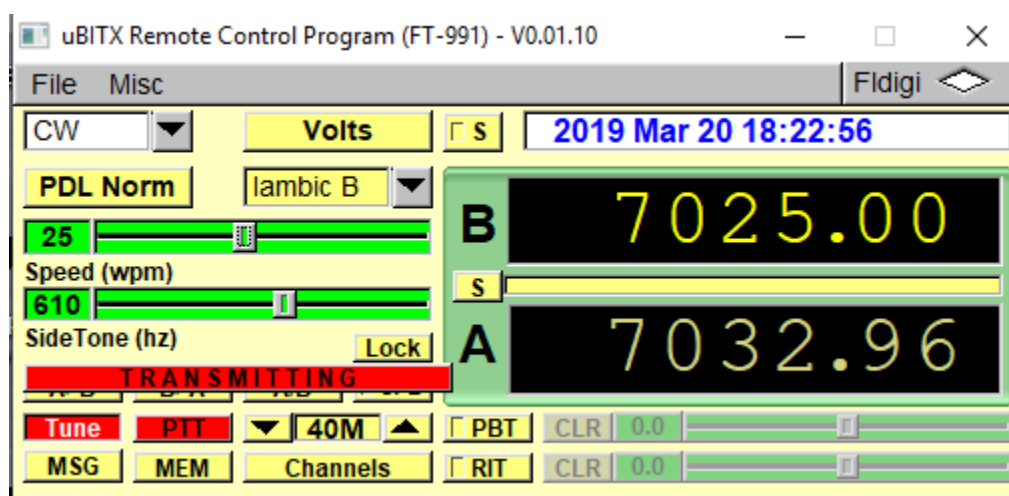
The green slider below the paddle controls is your keyer speed control. The slider will control the speed from 5 WPM up to 50 WPM and you can either click on the "knob" and slide it or place the mouse cursor on the line and use the scroll wheel (if you have one) to roll the speed up or down.

The Tone slider below that functions the same way but controls the side tone frequency. The ST does NOT sound while using it however.

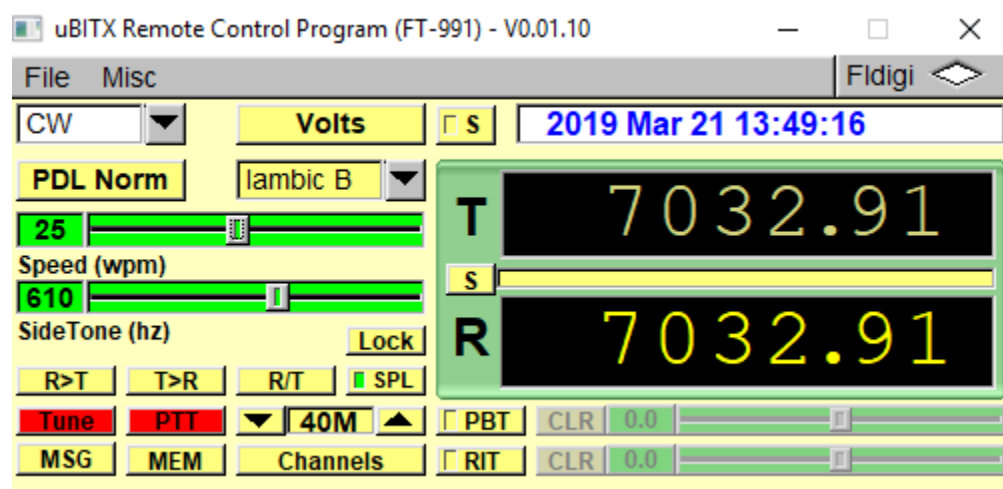WARNING! The PTT and TUNE buttons BOTH place the uBITX into TX.

PTT is used in SSB mode and when you click on it, the red "Transmitting" banner will display and the rig will stay in transmit until the button is clicked again when the uBITX will return to RX and the red "Transmitting" banner will disappear again.

Tune is used to place the rig into transmit and regardless of the selected mode (except for the SWL and SWU short wave listener modes) an on-frequency CW carrier will be transmitted to allow for adjusting antenna tuners, etc. The red "Transmitting" banner will display and the side tone will also sound during the duration "Tune" is active.

The A>B, B<A and A/B buttons are convenient in that when pressed they will copy one VFO frequency into the other in the case of A>B (copy A into B), B>A (copy B into A) or in the case of A/B each time this is pressed the frequencies in A and B are swapped.   If they are different you will see the swap but if they are equal, no change will occur.

The Split button, when clicked first makes the frequency in VFO B the same as that in VFO A and puts the uBITX into "Split" mode where the transmit frequency is controlled by VFO B and receive is controlled by VFO A. When active, the little window to the left of "Split" in the button will change to green.
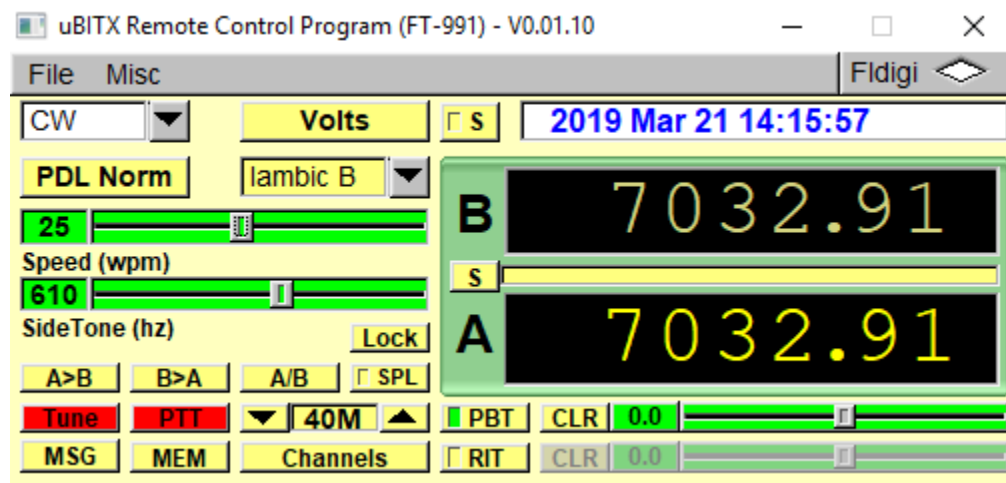

The designator buttons for the A and B VFO's will change to "R" and "T" respectively and the one being tuned will have the frequency appear brighter than the other one .   To turn off Split, just click the button again and the little green box will go back to yellow and the VFO indicators will return to A and B again.

The PBT button allows "Pass Band Tuning" to be turned on and off. The Slider to the right of PBT allows tuning the passband center above or below the center of the crystal filter to allow you to tailor the filter response and
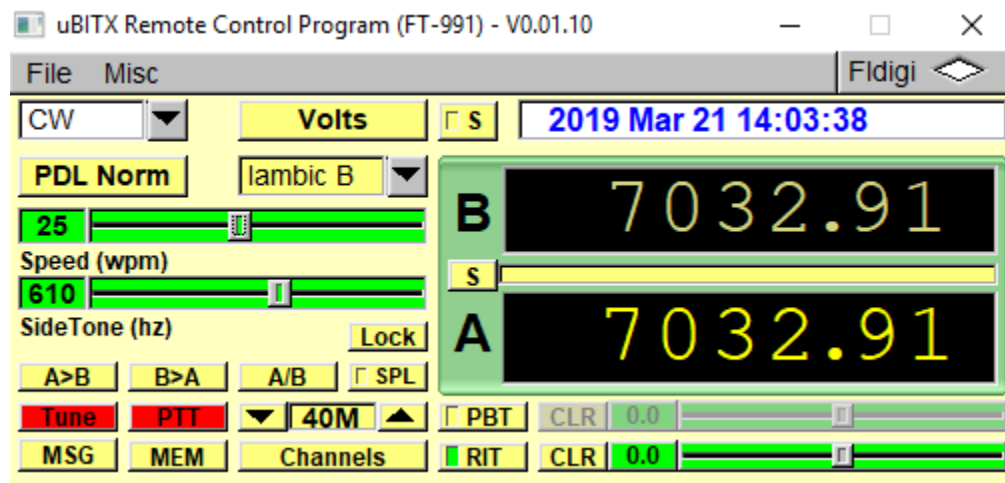
help minimize or eliminate interfering signals close to the frequency you are receiving.

When PBT is pressed, the small window to the left of PBT will turn green indicating that the function is active and the slider to the right of the button will become bright green. You can tune PBT by dragging the slider with the mouse or using the mouse wheel to move it (the mouse cursor must be placed somewhere within the slider's block). The CLR button will put the passband back to being centered on the filter while leaving the function active.
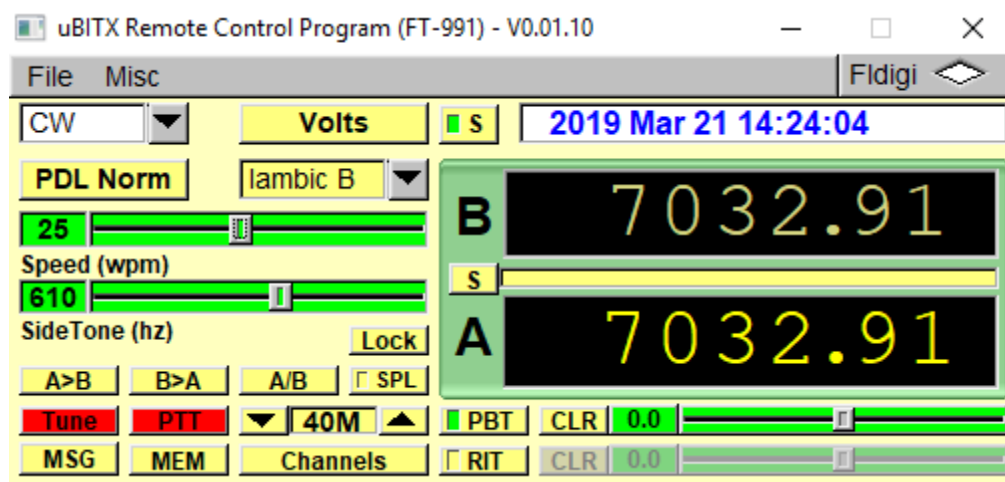

The Rit button allows for fine tuning the receiver frequency independent of the transmitter to help when someone calls you but slightly above or below your frequency. When you click on the Rit button, the little window to the left of the R changes to green indicating that Rit is active and the adjustment slider to its right becomes bright green to indicate that it is active. You can use your mouse wheel to operate this slider or you can click and drag the slider however you like. Clicking the Rit button a second

time turns the feature back off. The Rit's range is + or – 5 KHz from the indicated frequency of the active VFO.
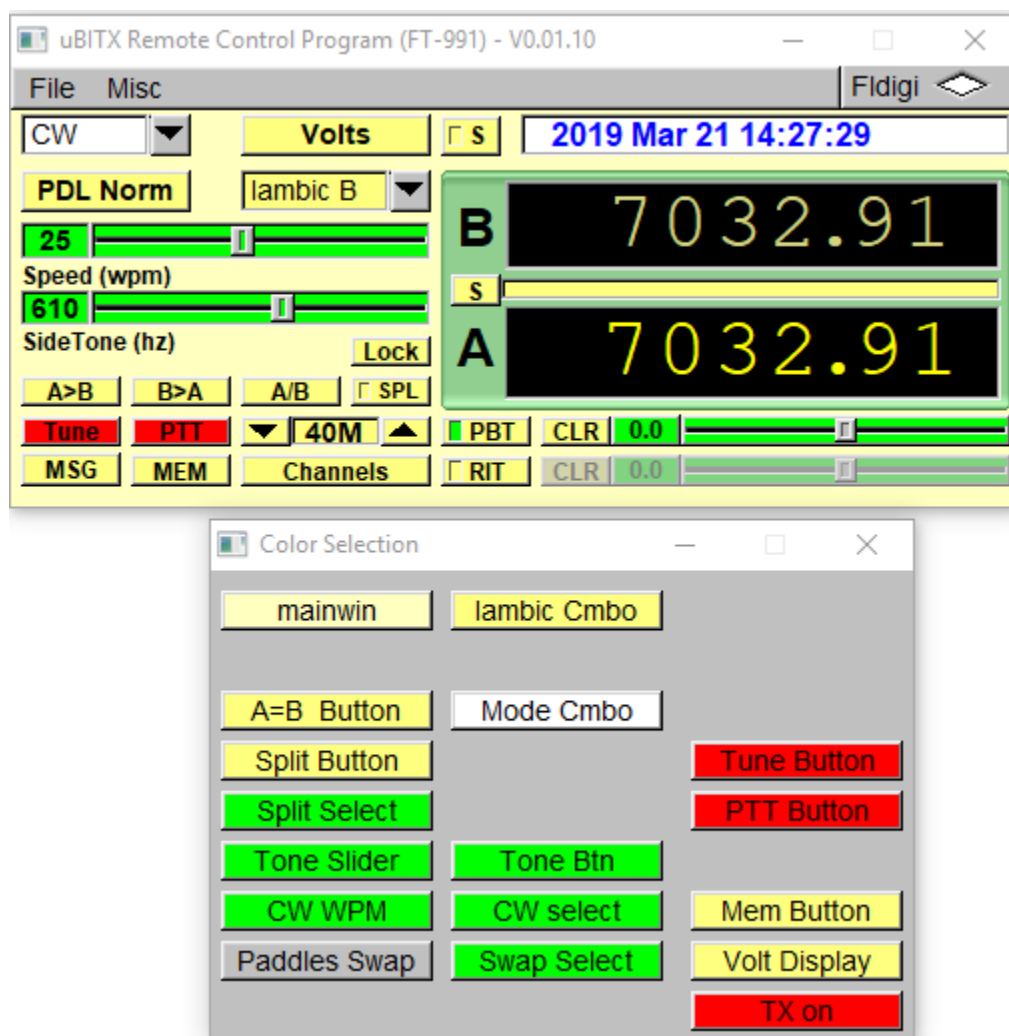

The CLR button to the right of RIT, when pressed sets the RIT offset to zero but leaves RIT on with the slider centered but still active.

There is one other button (just to the left of the Date/Time window in the upper right) labeled "S". This is a special button that controls the backlight of the color touch screen display screen on the uBITX radio ONLY for the TSW's 5" display which has been discontinued. The button is in place and though the indicator window will turn green when pressed, it will have no effect on anything other than a uBITX containing the 5" color display.

The final item is the ability to customize the look of the main program window. Under the Misc pull-down menu, is an item you can use to set the colors of all the different buttons, windows, sliders and other features of the program. You will have to experiment with this a bit to find the color combination that suits you if it differs from the "Factory" settings. Some of these settings are for future use and not yet implemented. Also, the Time Set feature is not implemented for any card running our software that has an Arduino NANO as the micro-controller as the NANO does not have a built-in "Real-Time-Clock".

Also under configure I/O you will see references to FLDIGI with an "fldigi socket addr (defaulted to 127.0.0.1) and an fldigi socket port (defaulted to port 7362). These are for use with the FLDIGI program and though this remote control program does not allow FLDIGI to control the uBITX, it will pass frequency and mode information to FLDIGI from the uBITX via this program to aid in FLDIGI operation.

Please contact Ron Pfeiffer, W2CTX (w2ctx@yahoo.com) to report any bugs or concerns regarding this program. – Enjoy –

Credits:

Document author/editor, Jim Sheldon, W0EB
Program author and primary editor, Ron Pfeiffer, W2CTX.