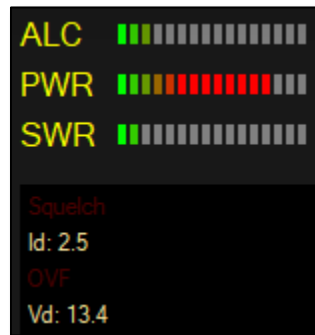


# ALC-PWR-SWR Virtual Meter for Monitoring Remoted ICOM Radios During WSJT-X Operations



Virtual Meter Display GUI

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## ALC-PWR-SWR Meter for Remote Ops

By Gene Hinkle, K5PA

**Rationale:** When operating FT8/FT4 or other digital mods remotely, I normally use a remote desktop program (RDP), such as *AnyDesk* or *TeamViewer*, to control the GUI of these programs. The transceiver connected is normally an ICOM IC-7300 or IC-7610 making it very easy to operate these digital modes. One item missing is knowing in real-time the Power and SWR for the transmitter since they are not displayed by the application programs. This project adds this capability by simply reading the computer CI-V control signal and displaying the values using a bar graph display. This can be used while operating FT8, FT4, or any other mode.

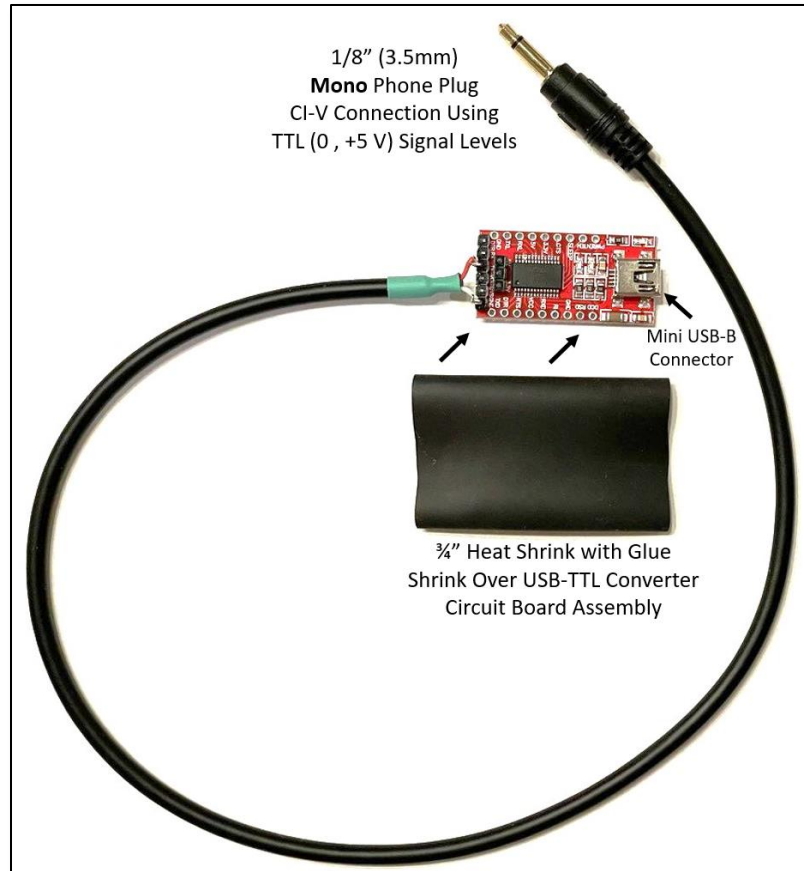
When I use WSJT-X FT8 or FT4 I also regularly use JTAlert to identify wanted call signs and to link to my logging program(s). For logging, I use Ham Radio Deluxe (HRD Logbook) since it easily keeps track of my remote locations that have different geographic locations. With JTAlert, it is very easy to Auto Load the HRD Logbook program to fully automate the startup process.

My approach to providing the ALC-PWR-SWR display is to use Ham Radio Deluxe Radio Control program to provide the graphical interface. So now, when loading HRD Radio Control from JTAlert, I can easily autoload the HRD Logbook at the same time, allowing full automation of this process.

If the reader would rather use another logging program that is alright, but the HRD Radio Control would still be the method used to display the ALC-PWR-SWR graphics.

**CI-V Interface:** On the ICOM transceivers mentioned, there are two CI-V ports that can be used to control and monitor the transceiver. These CI-V ports may be bonded together via a setting in the radio or they can be made independent. With WSJT-X, the audio plus CI-V signals are connected to the computer using the USB port(s) on the radio. However, the secondary CI-V port is still present and is located on the REMOTE connector found on the rear panel of the IC-7300 and IC-7610. It is only a matter of unbonding these two interfaces so one can be used with the WSJT-X program and the other used with the ALC-PWR-SWR virtual meter program.

**Implementation:** To construct this interface several items are needed. The first is a CI-V interface meeting the specifications for CI-V control. This is defined as a USB to TTL interface plugged into the REMOTE jack at the rear of the transceiver. The jack is a 1/8-inch (3.5 mm) **mono** phone plug that has both Transmit (Tx) and Receiver (Rx) data lines **connected** and tied to the tip of the phone plug and the shield or ground connected to the sleeve. (Tip-Sleeve configuration defines a mono phone plug)

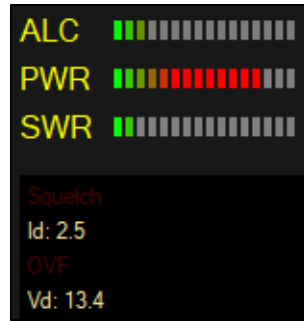


***Caption:*** Cable and USB to TTL Converter for REMOTE Jack Connection.  
 The Mini USB-B plug cable connects to the USB-Type A connector shown.  
 Disregard the cable portion shown off to the left in this photo.

Figure 1. USB to TTL Converter for CI-V Connectivity

Once the USB-TTL converter is plugged into the REMOTE jack and then plugged into the host computer, the program to read and display the ALC-POWER-SWR can be run. Originally, the approach was to write the software to read the CAT commands from the transceiver in real-time and then display the data in a bar chart. However, a *voila* moment occurred when I realized the USB and REMOTE CI-V ports can be operated independently meaning the REMOTE port could be used to read and display the ALC-POWER-SWR. Each port must have their own USB COM port assigned.

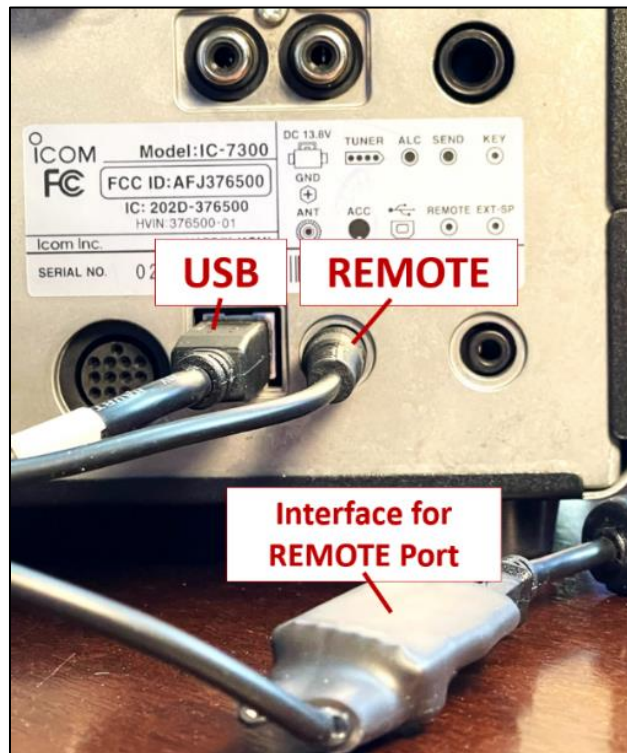
This allows any software that can read and display the information can be used. I have been using Ham Radio Deluxe for a while but normally only use the logbook program. The radio control program does have a graphical display for the ALC-POWER-SWR plus the transmitter voltage and DC current values. It was only necessary to use HRD Rig Control to interface to the USB port from the REMOTE jack and then display the values read!



*Caption: The GUI is reduced in size to display ONLY the graphical values desired*

Figure 2. Graphical User Interface of the HRD Rig Control with the Window Reduced

**Connections to the ICOM Radio:** The USB to TTL converter simply plugs into the rear panel or the IC-7300 or IC-7610 transceivers. Below is a photograph for the connection of the IC-7300.



*Caption: The USB connector is for the WSJT-X Radio Control and Sound.*

*The REMOTE is for reading the ALC-POWER-SWR using a different COM port.*

Figure 3. Rear Panel of the IC-7300 Showing Connection to the REMOTE Jack

**Program Setup:** The USB port from the radio shown above is used to connect to the WSJT-X program COM port. This is the normally used method of connecting the program to these transceivers.

**Radio Settings Setup:** In the IC-7300 and IC-7610, the USB port and REMOTE port must be separated using the front panel MENU (manual manipulation of the push buttons and soft buttons). Do the following on the IC-7300 to disconnect the USB from the REMOTE port. A similar manipulation is done with the IC-7610 as shown in the second sequence below.

### **FROM THE FRONT PANEL OF THE IC-7300**

Press:

- **MENU**
- **SET**
- **Connectors**
- **CI-V**
- On screen 1 of 2, Press **CI-V Baud Rate**
- Select **19200** and then back of this one screen.
- On screen 2 of 2, Press **CI-V USB Port**
- Select **Unlink from [REMOTE]**
- Back out of all screens to main screen by pressing ↩ **Return Arrow** 3 times.

### **FROM THE FRONT PANEL OF THE IC-7610**

Press:

- **MENU**
- **SET**
- **Connectors**
- **CI-V**
- On screen 1 of 2, Press **CI-V Baud Rate**
- Select **19200** and then back out ↩ this one screen.
- On screen 1 of 2, Press **CI-V USB Port**
- Select **Unlink from [REMOTE]**
- Back out of all screens to main screen by pressing ↩ **Return Arrow** 3 times.

**Ham Radio Deluxe Settings Setup:** When setting up the HRD program, you will need to identify the COM port that the USB to TTL converter interface is assigned as it is plugged into the computer’s USB connector. Use this setting for the IC-7300 or IC-7610.

On the main HRD menu, select **VIEW, Customize, Radio Layout**.

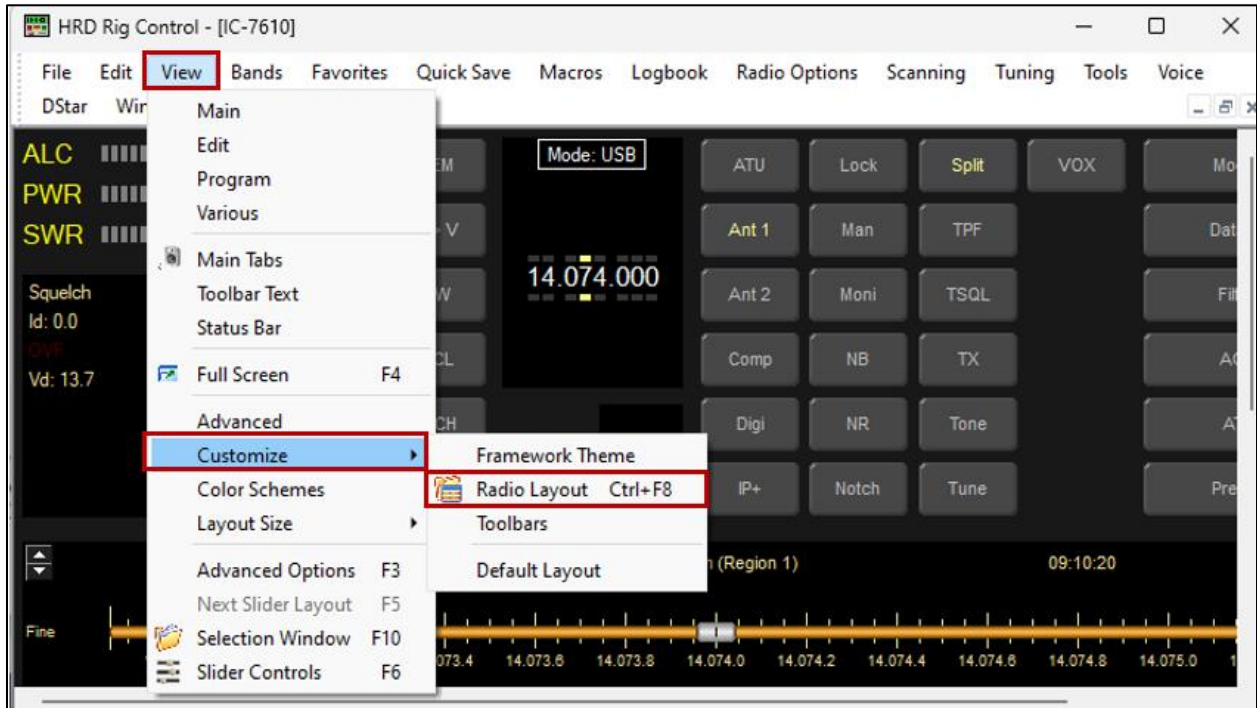


Figure 4. Go to the **Radio Layout** GUI

Select **Schemes** and **Save to File** then type in a file name to signify the current setting prior to your changes. I selected ORIGINAL as my name prior to making edits.

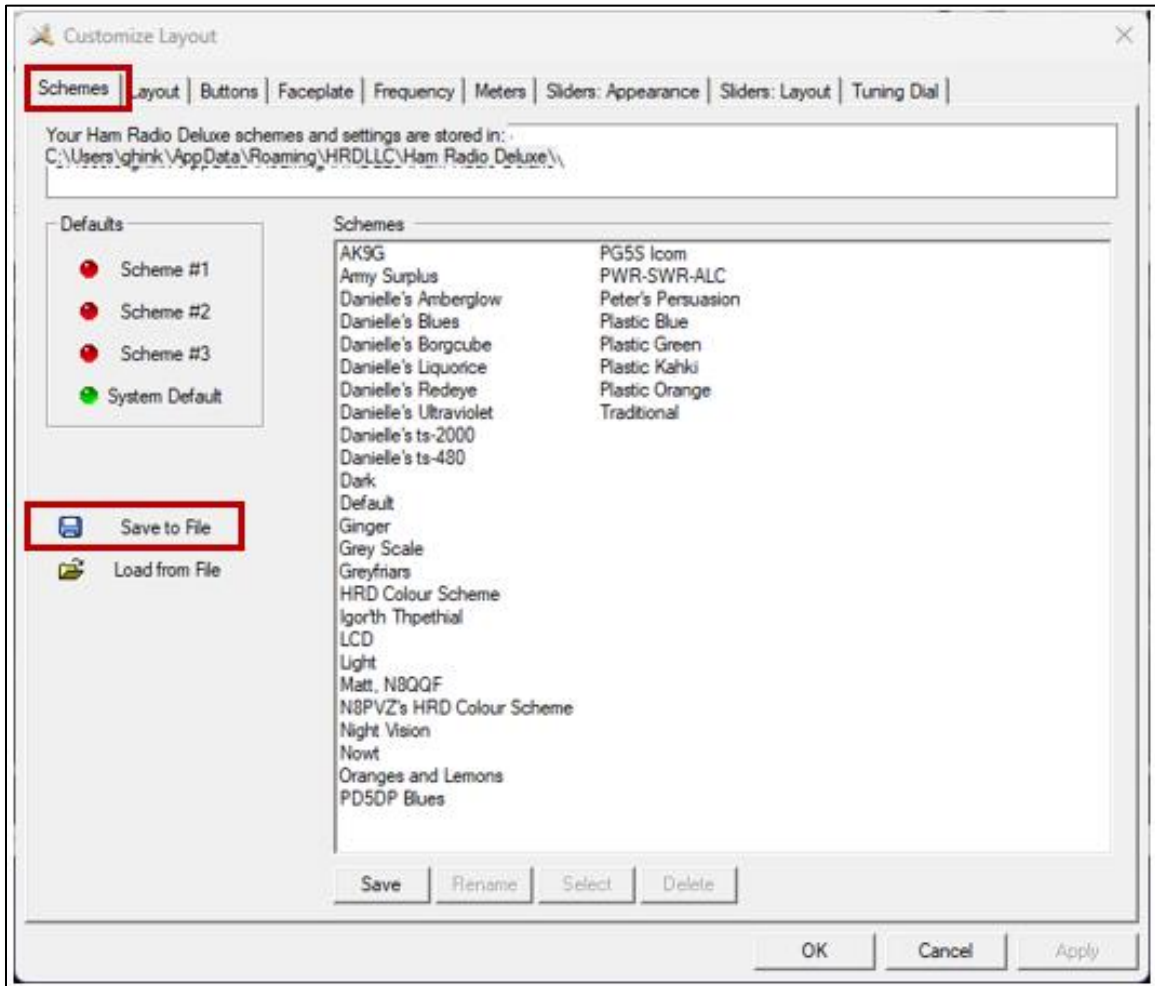


Figure 5. Go to the **Schemes** and **Save** the ORIGINAL Settings

Once Saved, look at the top menu items and select **Layout**.

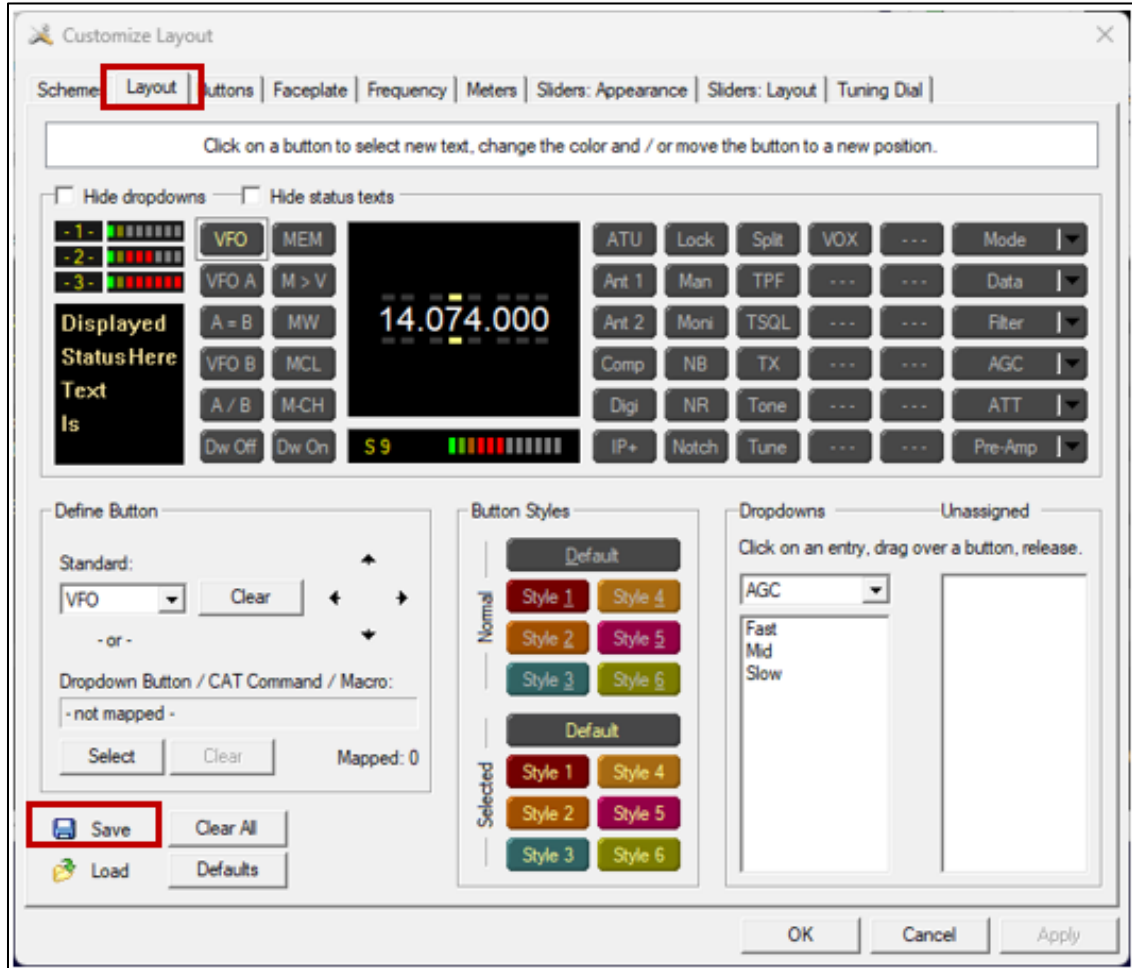


Figure 6. Go to the **Schemes** and **Save** the ORIGINAL Settings

On the **Layout** screen, select **Save** and again select a layout name prior to any changes. That way you can always go back if needed.



Looking at the top Customize Layout menus, select **Meters**.

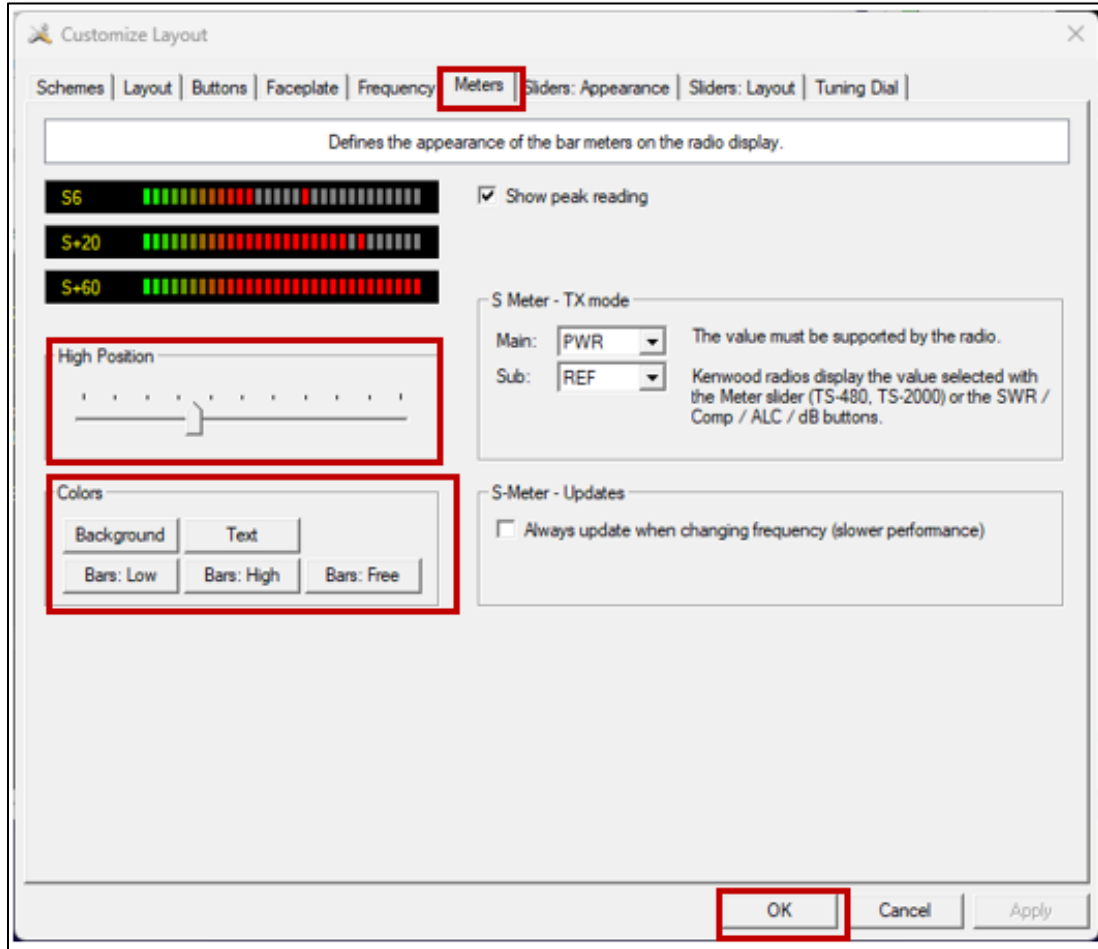


Figure 7. Go to the **Meters** and Adjust to Your Liking

On this menu you can now select your **High Position** and **Colors** for your **Background**, **Text**, **Bars: Low**, **Bars: High**, and **Bars: Free**. When satisfied with your selection, you can click **OK** to exit.

**NOTE:** I would now suggest you now go back to the **Schemes** and **Save to File** using a new filename of your choice to correspond to your choices for ALC-POWER-SWR.

**Also**, go back and save the changes to the **Layout** so you also have these saved as well. I named my Schemes and Layout changes to the filename ALC-POWER-SWR so I could easily recall these when necessary.

Finally, under the main HRD menu, select **VIEW, Layout Size** if you want to increase the size of the graphic bar images. I selected **Extra Large**.

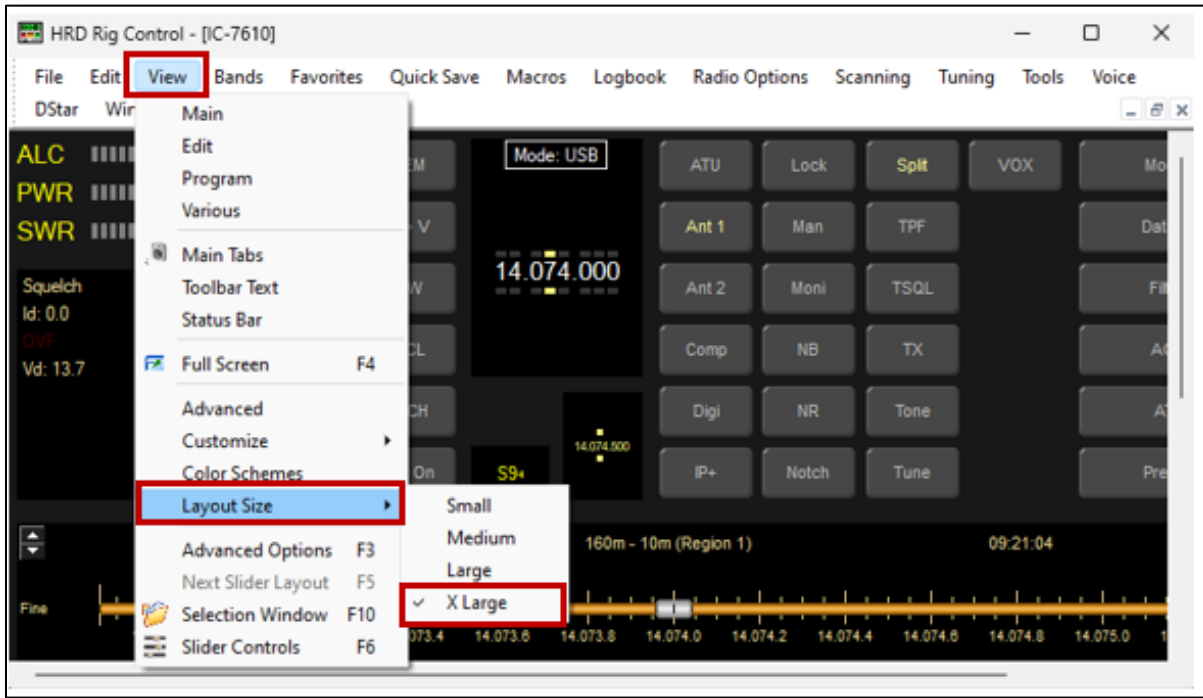


Figure 8. Go to the **View, Layout Size**, and Select **X Large**

You can also decrease the polling period on the transceiver to the minimum allowed. From the main menu, select **Radio Options, Options, Comms** tab, then *Refresh Interval* to **100 (milliseconds)**, then click **OK**.

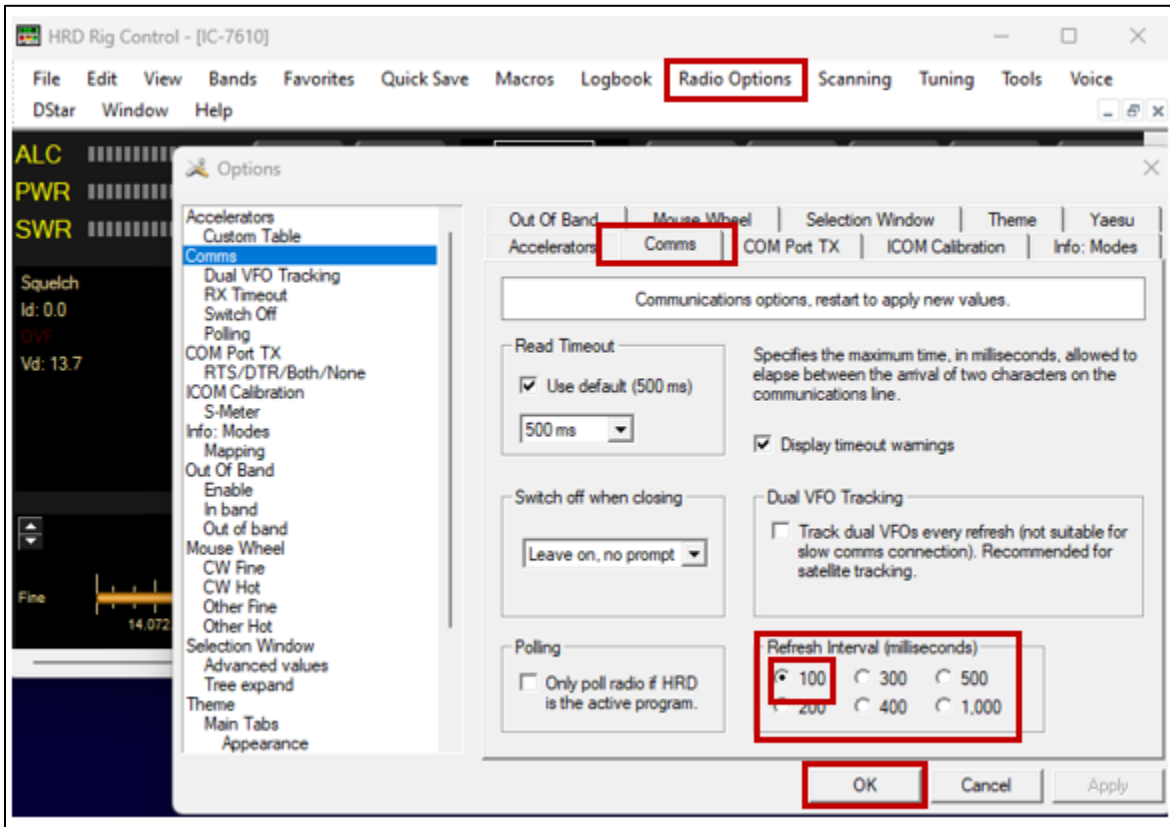


Figure 9. Go to the **Radio Options** and Select **Refresh Interval** to **100 (ms)**

When you are satisfied with your selections, you can resize the HRD window, so it only shows the bar graphs and the Squelch, Id (power supply current drawn by the transmitter) and Vd (transmitter's power supply voltage during transmit) values. This keeps it smaller, so it does not compete with another program's GUI's.

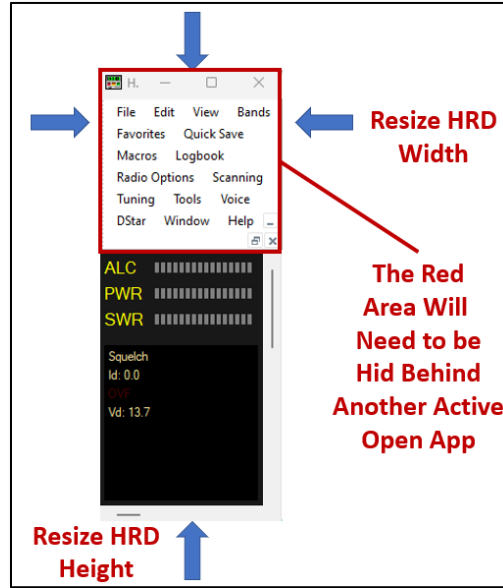


Figure 10. Resizing the ALC-PWR-SWR GUI to Fit with Other Apps

It is also possible to take the menu portion and drag them away for the graphic window to just show the lower portion for the meters. This is depicted in the Figure below.



Figure 11. Moved Top Menu Off the ALC-PWR-SWR GUI to Fit with Other Apps

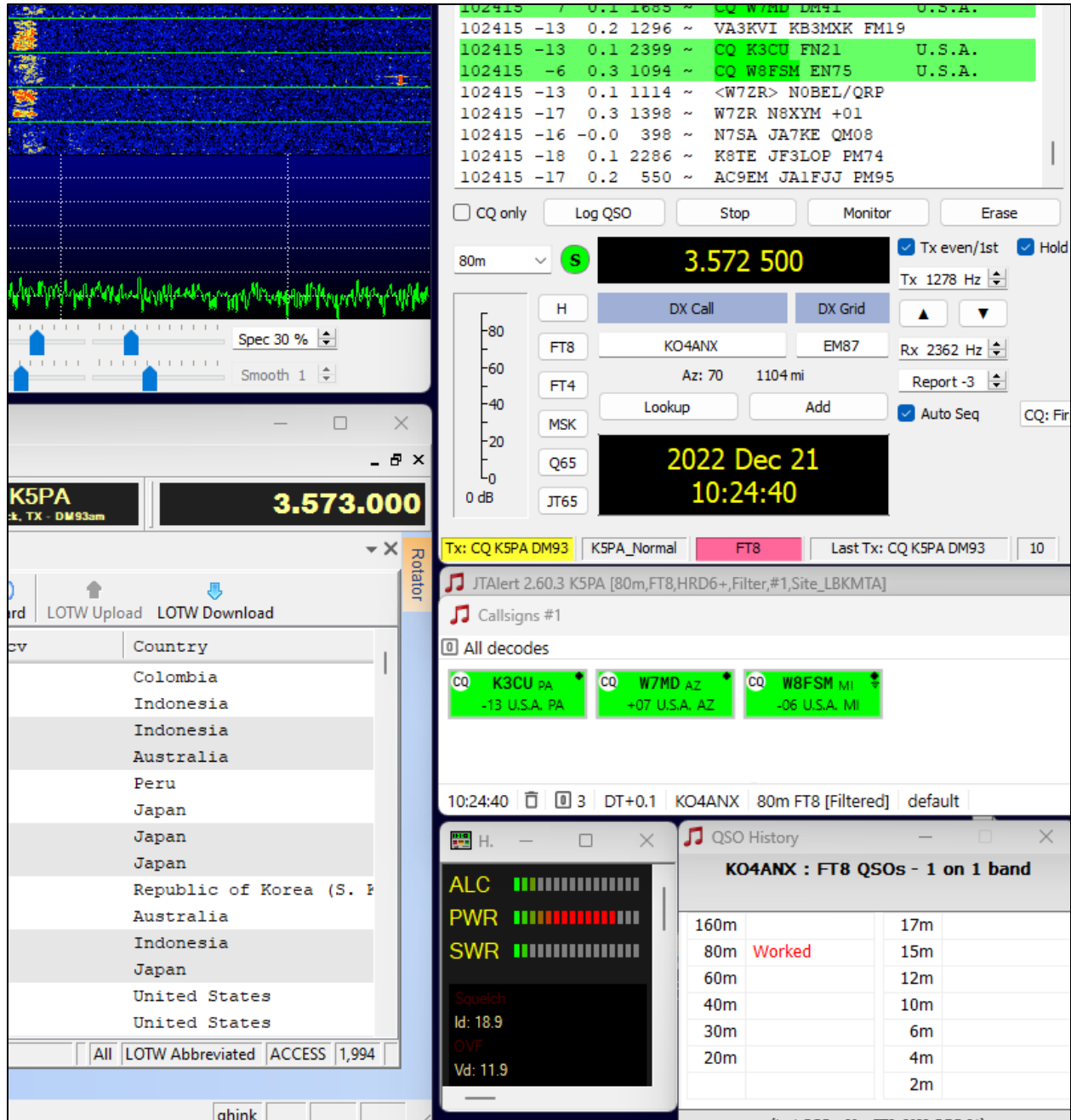
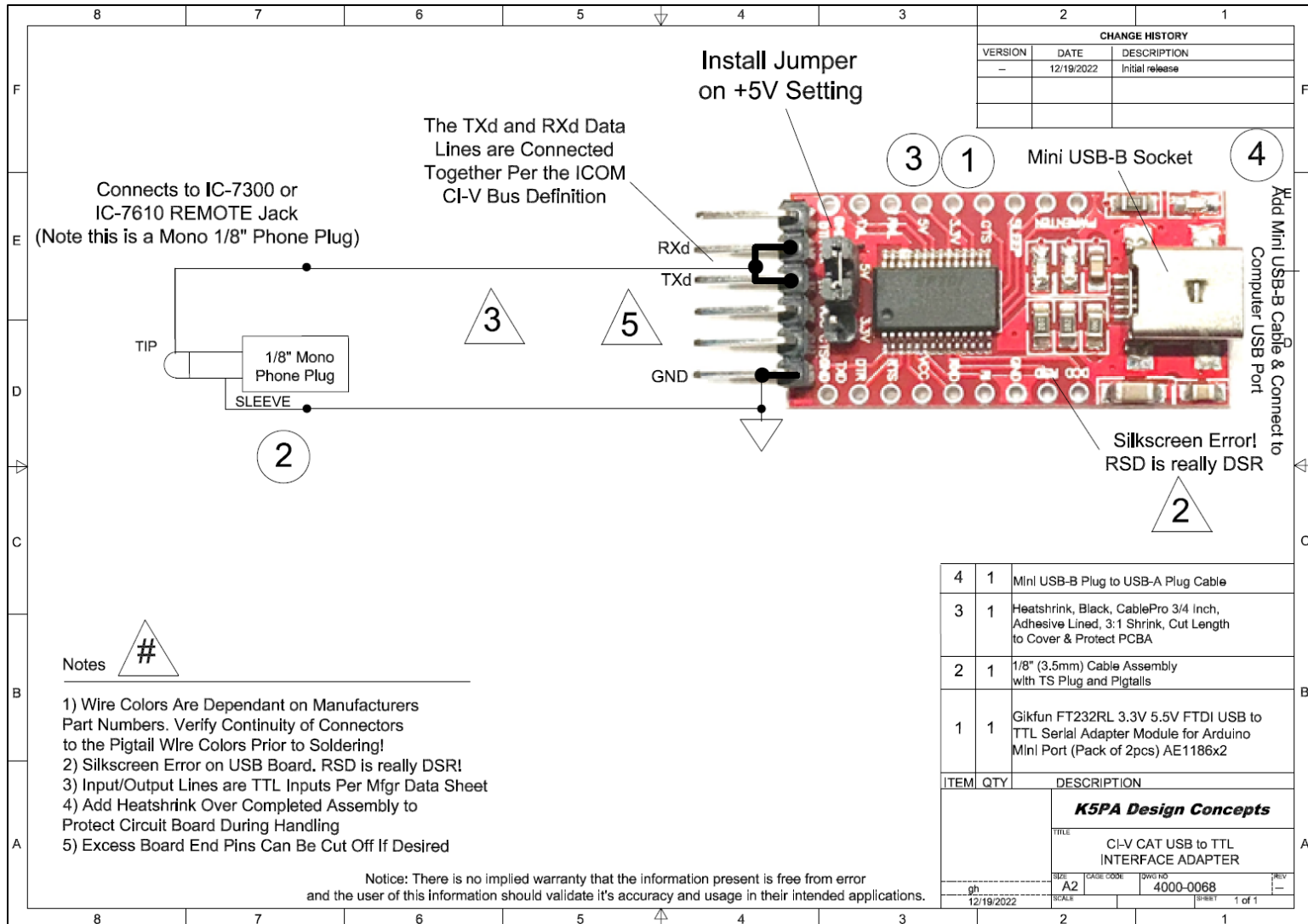


Figure 12. Final Placement in the Author's Apps Running FT8

## Appendix – A

### Construction of the CI-V USB to TTL Interface Cable/Adapter



**Materials List for Item Numbers in Drawing. Search Amazon for the Part Description**

Bill of Materials Drawing 4000-0068 rev--		ALC-PWR-SWR Virtual Meter for Remote Ops 12-21-2022				
Item ID	Part Description	Mfgr	Part No.	Vendor	Qty	Per Unit Item Cost
1	3.3V 5V FT232RL USB to TTL Serial Converter Adapter Module for Arduino 4 pcs <b>or Equivalent</b>	Songhe or Gikfun	B07R64LHLB	Amazon	1	\$ 2.72
2	TENINYU 3.5mm Mono Cable - 12V Trigger, IR Infrared Sensor Receiver Extension Extender, 3.5mm 1/8" TS Monaural Mini Mono Audio Plug Jack Connector Male to Male Cable (3FT) or Equivalent	TENINYU	B07PMZXL3Y	Amazon	1	\$ 4.33
3	Heatshrink, Black, CablePro 3/4 Inch, Adhesive Lined, 3:1 Shrink, Cut Length to Cover & Protect PCBA or Equivalent	CablePro	B09W236H79	Amazon	1	\$ 5.99
4	Monoprice 3-Foot USB 2.0 A Male to Mini-B 5pin Male 28/24AWG Cable with Ferrite Core (Gold Plated) (105447) ,Black <b>or Equivalent</b>	Monoprice	105447	Amazon	1	\$ 4.72