

Using the UARC HF remote station(s)

IMPORTANT CHANGES:



There are now TWO HF remote stations available to UARC members:

- **The W7SP remote at Leamington, Utah**
- **The WA7X remote near Fairview, Utah**

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The Utah Amateur Radio Club's HF has two HF remote stations available to all members in good standing that hold a valid General, Advanced or Extra class amateur radio license. If you wish to use these HF remote stations, send an inquiries via email to:

hfmanager@utaharc.org

If you wish to join UARC, visit the Utah Amateur Radio Club web page (<http://www.utaharc.org>) and click on the "[How to join or renew](#)" link along the left side.

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Overview of UARC's HF Remote stations

The Utah Amateur Radio operates **TWO** remote HF stations:

- One owned and operated by the Utah Amateur Radio Club (W7SP) in grid square DM39 near Leamington, Utah. *Information specific to the **Leamington** remote will be highlighted with **CYAN**.*
- Another owned and operated by Glen, WA7X, in grid square DM49 near Fairview, Utah. *Information specific to the **WA7X** remote will be highlighted with **YELLOW**.*

Both of these stations use the same remote access software and very similar transceivers. They do, of course, have **different** antenna systems as described below.

The Leamington remote:

This club-owned HF station near the central Utah town of Leamington in the DM39 grid square. Located at this site is a computer-controlled HF transceiver that is connected to two HF antennas:

The radio:

The radio at leamington is a Kenwood TS-480S capable of operating from 160 through 6 meters. This is a 100 watt radio with a built-in antenna tuner capable of modest adjustment range which means that it can tune resonant antennas somewhat beyond the design frequency range – but it won't be able to “force feed” antennas that are too far beyond a 50 ohm match.

Antenna ONE:

This is a G5RV antenna capable of operating across much of the 80 meter band as well as the 40, 20, 15 and 10 meter bands – and likely the 6 meter band. The highest end of this center-fed antenna is at approximately 35 feet and it and the ground slopes so that the far end is about 15 feet above the ground.

This antenna does **NOT** work on the 160 meter band and it may not work 60, 30, 17 or 12 meter bands.

Antenna TWO:

This is a transformer-fed end-fed half-wave antenna with a fundamental frequency of approximately 1850 MHz. As such, it can be used on the bottom-half of the 160 meter band (1800-1900 kHz), much of the 80/75 meter band, the 60 meter channels and the 40 meter band. The “feed” end of this antenna is at approximately 65 feet above ground with most of its 260 foot length being higher than about 30 feet above ground. The transformer's performance is optimized for the bands 40 meters and lower in frequency.

It is expected that this antenna will generally outperform antenna ONE (the G5RV) on 160, 80 and 40 meters. It may “tune” bands for which it is not intended to be used, but

it is not expected that it will work as well as the G5RV on the 30, 20, 17, 15, 12 and 10 meter bands. It has been found to work on at least some of the 60 meter channels.

Antenna THREE:

This is a Cushcraft ASL-2010 log-periodic beam antenna that is designed to work on the 20, 17, 15, 12 and 10 meter amateur bands. Its location - on a 20 foot tower that itself is mounted on the 70' high platform atop the main tower - places it clear of local obstructions. A remotely-controllable rotator allows this antenna to be pointed at any desirable azimuth.

The WA7X remote:

This HF station is owned and operated by Glen, WA7X and is located near the central Utah town of Fairview in the DM49 grid square and he has kindly given permission for its used by those who have permission to use the Leamington remote. Located at this site is a computer-controlled HF transceiver that is connected to two HF antennas:

The radio:

The radio at the WA7X remote is a Kenwood TS-480HX capable of operating from 160 through 6 meters. This radio is **identical** to the radio used at Leamington, except:

- This is a **200** watt radio rather than 100 watts like the TS-480S.
- It does **NOT** have a built-in antenna tuner: The radio's internal space for the antenna tuner is where the extra 100 watts of RF output comes from.

Antenna One:

This antenna is an offset-fed dipole, fed with window line, that is **NOT** resonant on any particular amateur band. Because the TS-480HX does not have a built-in tuner, an external antenna tuner is used. This antenna – via the tuner – is usable across most of the HF bands.

Antenna Two:

This is an end-fed half-wave antenna cut for 80 meters, which means that it is usable on the upper portion of 80 meters, most of 40 meters and most of 20 meters. It is provided as an alternative to the offset dipole as it **may** offer superior performance under some conditions.

There is **NO** antenna tuner connected to this antenna, so its available frequency range is less than that of the offset-fed dipole + tuner. A *possible* enhancement of this antenna is to make it possible to use the antenna tuner with it.

In the sections that follow you will find information related to the installation of the program required to remotely operate this radio, how to get permission to transmit, and details about operating this radio.

Section 1: Accessing the remote stations

The Leamington Remote:

The Utah Amateur Radio Club (UARC) has established a remotely-accessible HF station near the central Utah town of Leamington, about 22 miles east of Delta. This system allows operation on all amateur bands from 160 through 10 meters using CW and SSB. **Transmission using digital modes is not currently available.**

The WA7X Remote:

This station, owned by Glen, WA7X, is located near the central Utah town of Fairview. It has been kindly made available to UARC members that qualify for use of the Leamington remote. This system allows operation on most amateur bands from 80 through 10 meters using CW and SSB. **Transmission using digital modes is not currently available.**

This station allows HF operation by those who may not have their own station or are in an area where – due to local restrictions or high noise levels – may only be able to set up a “sub optimal” HF station.

How to get access to these stations:

Note: *Anyone* may use these remotes if they are just listening. It is **only the ability to transmit** that is limited to club members with the appropriate license.

If you wish to obtain **transmit** access to this station, there are a few prerequisites:

- You must be a member of the Utah Amateur Radio club in good standing or receive “special dispensation” on a case-by-case basis by the UARC president.
- Review Section 10 of this document. *Contact information may be found there.*
- If you wish to transmit from this station, you must have a current **General Class** or higher amateur radio license. *(You do not need a license to listen.)*
- You must contact the president of the Utah Amateur Radio Club and request access to the station.
- You must read and agree with the “[Guidelines for use of the UARC Remote HF Radio Station](#)” document.
- If you have other questions, feel free to contact the HF station manager at: hfmanager@utaharc.org

Important:

This manual is targeted for use by someone who already has some experience operating on the HF amateur bands: It is not intended to be used as a “how to” manual for operating on the HF bands for the first time.

If you are new to HF operation and need help, contact the HF manager.

“OK, I have been given access – now what?”

There are two ways to access the HF stations:

- With the **free RCForb** Windows program. (*Sorry – no Linux or Apple versions yet...*)
- With the **RCForb** Android app which may be obtained for \$10 from the “Play Store”. (*Sorry, no IOS version yet...*)

We recommend that you use and get familiar with the Windows program – which is **free** – **before** spending \$10 (*non-refundable!*) for the Android app.

Section 2: Getting and installing remote software

Getting the program:

The RCForb Windows *client* software may be downloaded from this site:

<http://download.remotehams.com/>

A useful installation document may be found on the following web page. ***Please download and read it:***

<http://www.remotehams.com/help.html> - Download both the “**Getting Started Guide**” and the “**RCForb Client Manual**”.

IMPORTANT: On the download page you will find several versions of the RCForb client:

- ***It is strongly recommended that you use the newest version of RCForb 0.8: There is an “RCForb 0.9”, but it is reported to have a few bugs in some versions of Windows – particularly related to audio.***
- ***Once you are familiar with version 0.8, you can see if 0.9 will work on your computer, but make sure that both TX and RX audio work after upgrading!***

Important: You should download the Client software, **not** the Server software.

Prerequisites for the RCForb program:

- Before you can transmit, you must sign up for an account on the web site. This step is necessary to verify that **you** are, in fact, a licensed radio amateur in your country.
 - Click on “**Sign Up**” in the upper-left corner of the download page and you will be guided through the process. You must supply a valid email to do this.
 - **To use these remotes, your username MUST include your callsign.** This allows us to easily determine who is using the remote. *If you already have an RCForb username without an embedded callsign and don't wish to change it, please contact the UARC president.*
- **The computer must run Windows.** Version 0.8 will “officially” support XP, Windows Vista, Windows 7 and Windows 8 – and it seems to work fine with Windows 10. (See the RCForb download page for more details on supported operating systems.)
- If you want to transmit, you **must** be able to connect an external microphone. **An inexpensive headset with a built-in boom microphone is preferred.**

- ***DO NOT*** use the microphone built into your computer or laptop as these are not only noisy, but they will be far away from your mouth and pick up every sound and echo in your room: ***If you insist on using such a microphone, you will always get lousy audio reports and people will have difficulty understanding you!***
 - Many laptops do not have a separate microphone input. In some cases these computers can use a special headset (*see the manual*) but there may be other options:
 - Your computer must have a sound card ***with a microphone input***. Be aware that many laptops may lack a microphone input or require a special cable.
 - The use of an external USB sound card with separate speaker/headphone and microphone jacks and can be pretty inexpensive.
 - If your computer has Bluetooth, an inexpensive headset may work fine.
 - When running the Android app on a smart phone, users have had good luck using the internal microphone or bluetooth headsets ***as long as their microphone gain has been set correctly***. Using such a device in “hands free” mode usually results in rather poor transmit audio and is ***not*** recommended.
- It is ***strongly*** recommended that you use a headphone. These not only help with intelligibility in noisy band conditions, but keeping the receiver noise to yourself will prevent you from becoming unpopular with your spouse and/or kids!
 - A “decent” Internet connection. 1.5 megabits/second or higher is OK – but the more, the better, particularly if someone else is using your Internet connection to watch TV/Movies. A “solid” 4G or better cell phone connection is recommended for mobile use.
 - A mouse, touch screen or track-pad is highly recommended.

Installation of RCForb:

This part's simple: Simply download and install it as usual for a Windows program. Depending on your system, it may prompt for an update/installation of other supporting software.

For the best guide for installing RCForb please download the guides from the web site linked below:

<http://www.remotehams.com/help.html>

Download both the “**Getting Started Guide**” and the “**RCForb Client Manual**”.

Section 3: Configuring the RCForb program

Configuration of RCForb:

Log in:

After you have registered on the “remotehams.com” web site, start the RCForb program and click on **File→New Connection** (*upper left-hand corner.*) There, you will be prompted to enter your username and password of the account that you have set up.

Once you have logged into the network, the screen should be populated with available radios around the world.

Recommended:

- At the top of the screen, to the right of “File” and “Options”, you will see “* **Upload Amateur Radio License** *”. It is recommended that you upload a legible picture or scan of your *current* amateur radio license and upload it via this tab. This provides a means of aiding in the verification that you are a licensed amateur.

Important:

- Most (*if not all*) transmit-capable remotes you will find via the RemoteHams software will **require** that you obtain permission **before** you can transmit. To get transmit permission, use the contact information found at that radio’s link in the program.
 - It may take several days to a week or so before the operator of a particular radio installation will get back to you regarding permission to transmit.
 - **Transmit permission for some sites may be limited to members:** Some operators of remote stations, like UARC, require membership in the supporting organization as a “perk” and may not grant transmit privileges **unless** you are a member while still others may not be interested in granting you transmit permission at all.
 - Rules in certain countries may not permit operation of a remote transmitter located in that country by amateur radio operators *outside* that country.

Section 4: Connecting to the remote station and its basic operation

Connecting to a remote radio:

In the middle of the screen there will be a list of remote radio sites. Above this list, left of center will be a box labeled “Search” and in this box enter “UARC” (without the quotes, of course!) or “WA7X” (if you are using that remote) and hit **Enter**. At the top of the screen should appear the entry for the selected station as depicted below:



Figure 1:

“UARC” has been entered in the “Search” box and has resulted in the HF remote appearing at the top of the list of remotes. Enter “WA7X” for the Fairview remote.

Communicating with other users of the remote:

At the bottom of the main screen is the “chat room” which is used to communicate with other users of the remote.

Where it shows “type a message” in Figure 2, you may enter your own text (then click “send”) which will make it visible to all others currently using the remote. By

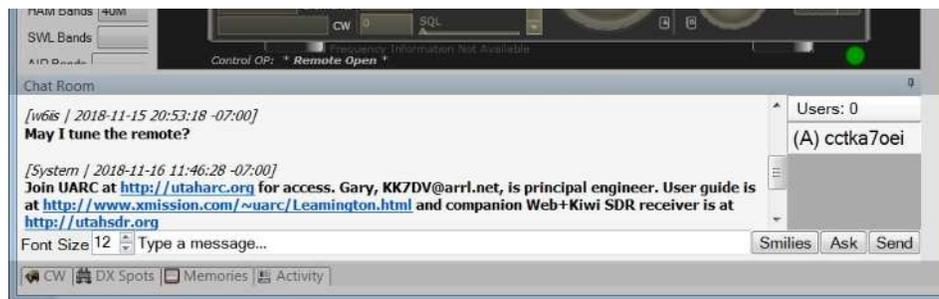


Figure 2:

The “Chat Room” at the bottom of the main screen may be used to communicate with other users – including requests to take control of the remote. By using the “slider” to the right of the text you may see a history of previous messages along with who sent them and when. If you click “ask” the text “May I tune the remote?” will be sent.

This chat is also useful for coordinating usage among operators as well as asking advice about how something might be done.

Double-click on the line with the UARC remote: This should cause a connection to the remote. When you connect to it, a screen will appear saying that it is “Starting Up” and if all goes well, you will see a graphical depiction of a generic radio that looks something like this:



Figure 3:

This is representation of the radio’s interface that you will see after connecting to a remote site.

There are a few features of this screen that you should observe:

- **Audio bar.** Along the top, just above the frequency display you will see a bar with a representation of audio waveforms just to the left of the “**Vol**” slider. This bar slides to the left and provides a graphical representation of the recent audio, the newest at the far right.
- **Vol** control slider. To the right of the audio bar is a small slider: This is how the receive audio is adjusted.
- **Mic** control slider. Just to the right of the **Vol** slider is the adjustment for the microphone gain – *more on this later*. **This setting is not remember unless you “save” it – see Figure 4.**
- **Frequency display.** In yellow, above the virtual tuning knob is a display showing the current frequencies.
 - The **upper** frequency is that of **VFO A**. In the lower left corner of the yellow display area you can see that the “VFO A” box is darker, indicating that VFO A is currently that to which the radio is tuned.
 - The **lower** frequency in slightly smaller numbers is that of **VFO B**. Next to the darker-gray VFO A box in the lower left corner of the yellow screen you can see that the “VFO B” portion is not darker, meaning that VFO B is **not** selected.

Checking receive audio:

At this point you should be seeing audio on the moving **Audio bar** at the top of the screen scrolling to the left and you *may* hear what is being received on your computer's speaker. (If the bar is a straight line and you hear nothing, read the sidebar "My speaker works but I see nothing on the audio bar".)

If you **don't** hear the audio – but you see the audio bar indicating audio signals as can be seen at the top of **Figure 3**, check the following:

- **Is the remote radio "powered" down?** If it doesn't seem to respond to tuning, press the **PWR** button on the **top row** in the panel to the right of the main display.
- **Vol** slider. Try moving the Volume slider to the right – it *may* have been turned all of the way down.
- **Are your computer's speakers enabled?**
 - If they are external, powered speakers, make sure that they are turned on and connected.
 - Make sure that you haven't muted the speakers on your computer or turned the computer's volume control all of the way down. To check this, play some music or a video on your computer and verify that the audio is working and fix any problems that you may be having.
- **Are you are using headphones or a remote Bluetooth speaker?** If so, make sure that these are connected/turned on, using music or video to troubleshoot.

If you have verified that you can get audio from your computer by playing music or video, here are a few more things to check:

- In the upper-left corner of the RCForb screen just under "File" is a drop-down tab labeled "**SPKR**". Click on this and make sure that your speakers are properly selected.
- **Note:** On some computers/Windows configurations this drop-down tab may not work correctly, making difficult/impossible to select the audio source. If this is the case:



Figure 4:

What you will see if the radio has been remotely "powered off"

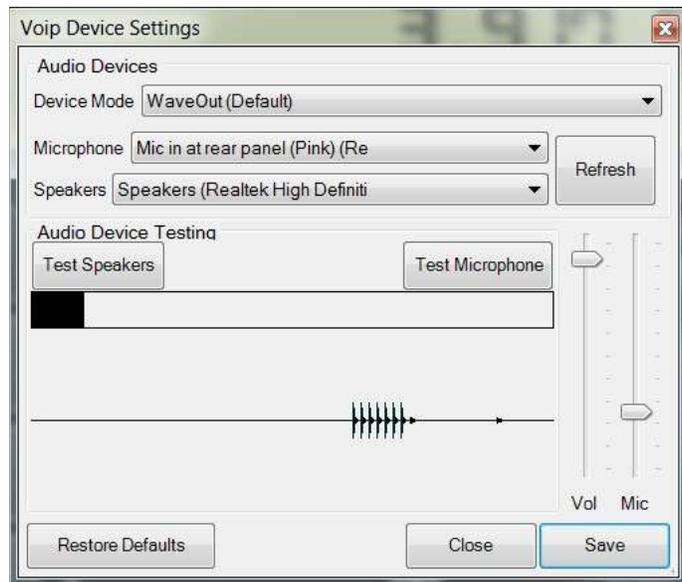


Figure 5:

The dialog box for configuring/testing audio in/out settings.

Important: Once you have determined the best settings for Vol (receive) and Mic (transmit) audio levels, click on the **Save** button. **Unless** you use the **Save** feature, the program will **not** remember your settings when you restart the program.

- In the upper left-hand corner to the right of **File** is the **Options** tab: Click this and select **Audio Device Settings**. The resulting dialog box is represented in **Figure 5**.
- Clicking on the **Test Speakers** button should produce a very brief noise. If it does, the RCForb client's audio is set up correctly and we'll check something else shortly.
- If clicking on the **Test Speakers** button *doesn't* make a noise, click on the **Speakers** bar to display a drop-down bar and select the proper speaker. **Note:** *It would be unusual for the "default" setting to not work "out of the box". One reason why it may not work is if you have more than one sound card and the default card is not connected to the speaker/headphone.* If you have more than one sound card you may need to try several selections.

If you can't get audio from the RCForb program *and* you see audio moving across the top of the screen *and* you have verified that you can play music/sound on your computer and hear it you'll need to do a bit more digging around and, possibly, enlist the help of your local computer nerd or a UARC officer.

Tuning the radio:

Once you are able to hear audio from the receiver you can tune around. There are at least **three** ways to tune the radio.

- **Using the mouse, "over" over a digit on the virtual radio's frequency display and use the mouse wheel.**
 - ***This is probably the easiest way to tune the radio.***
- On each frequency display are up and down arrows above/below each of the digits. One can use the mouse to click on each digit to change it: The frequency will change immediately.

"My speaker works, but I see nothing on the audio bar!"

The audio bar at the top of the RCForb screen indicates that the server is getting audio from the radio: If you see something *other* than a straight line – usually a bar of varying width according to amplitude – then the server *is* getting audio from the radio: If you can't hear this audio, re-check your configuration as described.

If the line is **flat** then there is no audio from the radio. While it's possible that something is wrong with the radio, it is more likely that someone else changed the radio's configuration such that there is no audio.

In that case, check the settings of the following sliding controls located below the frequency display. Note that you may have to use the "slider bar" to move the selection up and down to see them all.

- **RF Gain:** Set to "100%". If set to "0", the receiver is effectively disabled.
- **SQL** (squelch): Set to 0 to disable. If not zero, the squelch may be muting the audio.
- Verify that you aren't in transmit mode (*e.g. the "TX" button is yellow*). If it is in transmit mode, click on the "TX" on the virtual radio to switch it off **or** click on the "RX" button – next to the "VOX" button - in the extreme upper-right portion of the RCForb display to set it back to receive.

If you are still having no luck hearing audio, contact the HF station manager.

- **Note:** The smaller (*lower*) display is that of **VFO B** and changing its frequency will cause the radio to switch to VFO B. When a VFO's frequency is changed, the radio will switch to using that VFO as indicated by the "VFO A" or "VFO B" indicator on the main frequency display changing.
- **Direct frequency entry.** Just below the upper-left corner there is a virtual numeric keypad with blank line just below the label "**Number Pad**". Clicking on the empty line, you can enter the frequency one of two ways:
 - Type the frequency into the box using your computer keyboard. The frequency is, by default, in kHz but the "**Frequency Format**" box allows one to select between Hz, kHz and MHz as desired.
 - Use the "virtual keypad" just below the box to enter the frequency by clicking on the numbers.
 - Once you have typed the frequency, hit **Enter** and the radio will tune to that frequency.
 - **Note:** On some screens/displays this keypad may not render properly and not all buttons of the virtual keyboard may be visible, but you will still be able to enter numbers and the decimal point with your keyboard. This is an issue with the program and not your computer.
 - Just below the blank line where the frequency being entered is displayed are three buttons: "**A**", "**B**" and "**Both**". Selecting A or B will change the frequency of VFO A or B, respectively while selecting Both will cause the same frequency to be entered in both VFO A and VFO B.
 - When a frequency is changed, the radio will switch to using the VFO that you just changed as indicated by the "VFO A" or "VFO B" indicator on the main frequency display changing.
- **Using the virtual tuning knob(s).** On the virtual radio display there are two large tuning knobs and the frequency can be changed by hovering the mouse over the knob and then holding the left mouse button down while "dragging" the knob to turn it:
 - The largest knob just below the display next to the small letter "A" is for **VFO A**.
 - The smaller knob to its right next to the small letter "B" is for **VFO B**.
 - Again, when a VFO's frequency is changed, the radio will switch to using that VFO as indicated by the "VFO A" or "VFO B" indicator on the main frequency display changing.
 - **Adjusting tuning step size of the virtual knobs:**
 - If you use the virtual tuning knobs you may wish to set the step size. To the right of the smaller tuning knob (*the one for VFO B*) are two pull-down menus. In these menus are the step sizes in kHz, ranging from 0.05 kHz (*50 Hz*) to 1000 kHz (*1 MHz*).
 - For casual tuning on SSB even a 50 Hz step is a bit large and this limits the usefulness of the tuning knobs. If you wish to *precisely* tune in some stations, use the "up/down" buttons/mouse wheel on the display to tune the exact frequency of the other station.

Section 5: Other radio controls

For those familiar with the controls found on modern radios, the following section will be useful in knowing the “*how to do what*” and “*what works and what doesn’t*”. If you are not familiar with controls found on HF rigs the descriptions may help, but you may still wish to ask someone if you are still unsure about what they do and how they may be used.

Mode selection:

In the upper-left corner of the virtual radio display is the drop-down mode selector. On this remote system, ***only*** the following modes are supported:

- **LSB** – Lower sideband. This is used for voice communications on all amateur bands below 10 MHz (e.g. 160, 80 and 40) with the **exception** of the 60 meter channels.
- **USB** – Upper sideband. This is used for voice communications on all amateur bands above 10 MHz (e.g. 20, 17, 15, 12 and 10 meters) **and** on the channelized 60 meter band.
- **AM** - This is rarely used on any amateur bands with the exception of a few AM nets where many of the participants use vintage gear. *Please refrain from using this mode without first consulting a UARC officer.*
- **CW** - This is used for Morse communications and is legal on all HF bands. On this Icom radio, an “LSB” offset is used on the lower bands (*below 10 MHz*) and a “USB” offset is used on the higher bands. The **CW-R** mode is available and is opposite this convention. *See section 7 for more information about CW operation.*
- **FSK** – Originally intended for frequency-shift keyed modes RTTY (*Radio Teletype*) this is “mode” is the same as SSB except that the passband is shifted higher in audio frequency, cutting off the lows. Like the CW mode, this uses LSB for frequencies below 10 MHz and USB for those above, except for the **FSK-R** mode which, like **CW-R**, is opposite.
 - ***Do not use the FSK mode unless/until cleared by a UARC officer.***

Antenna:

The TS-480 has **two** antenna ports. These antenna(s) – which vary depending on the remote selected - are described below.

- **The Leamington remote:**
 - Antenna **ONE**: This is a “G5RV” antenna capable of being tuned on most bands from 80 through 10 meters *with the possible exception of the 60, 30, 17 and 12 meter bands*. Whether or not the radio’s built-in antenna tuner can match to a particular band may depend on the frequency of operation ***within that band***.
 - Antenna **TWO**: This is an end-fed half-wave antenna that has been designed to operate on 160 (*from approximately 1800 through 1900 kHz*), 80/75 meters (*the upper half*), the 60 meter frequencies and 40 meters. This antenna **may** “work” on other bands, but expect the G5RV antenna to have better performance – particularly on the higher bands.

- Antenna **THREE**: This is a Cushcraft ASL-20120 log-periodic beam antenna at about the 90' level above the ground that covers the 20, 17, 15, 12 and 10 meter bands. A remotely-controllable rotator, accessible via the RCForb interface, allows it to be pointed to any azimuth.
- **The WA7X remote:**
 - Antenna **ONE**: This is an offset dipole capable of being tuned on most bands from 80 through 10 meters. Because the TS-480HX does not have a built-in tuner, an external one is used, allowing a wider range of matching than is possible by most radios' built-in tuners.
 - Antenna **TWO**: This is an end-fed half-wave antenna that has been designed to operate on 80 meters (*the upper half*), 40 meters and a portion of 80 meters. This antenna is provided as an alternative to antenna #1 and users are encouraged to try both to determine which works best for the conditions.
 - There is **no** antenna tuner on this antenna, so compared to antenna #1, the frequency coverage is comparatively limited.

Note that the radio “remembers” the antenna selection on a per band basis: For example, if the previous user had antenna **Two** selected for 80 and 40 meters but antenna **One** selected for 20 meters, it will keep this setting.

Auto Tune:

This section applies to the Leamington remote, only

This selects the behavior of the radio's built-in antenna tuner:

- **Both RX/TX.** In this mode the antenna tuner will automatically tune the antenna as you change the frequency/band while receiving.
 - **Note:** This radio “learns” when transmitting the matching of the antenna to the particular frequency and it uses this information when tuning on receive. If the radio has never transmitted on this frequency, it will *not* automatically tune because it has no information on how to do so.
- **TX Only.** While receiving, the radio's built-in antenna tuner is bypassed, being switched in when transmitting.
- **Off.** The built-in antenna tuner is **always** bypassed.

Normal setting: “Both RX/TX”

Important:

The antenna tuners will “remember” the internal settings from the last time it was tuned to a specific band, frequency and also the antenna that was selected.

Examples:

- You have tuned to 3700 kHz using antenna One and press the “Tune” button. Next time you tune to 3700 kHz, the radio will remember the internal settings of built-in antenna tuner and will not have to find the match again.
- If you are tuned to 3700 kHz and switch to antenna Two and you press the “Tune” button. It will also remember the tuner’s internal settings – **but these may be different from antenna One**. In other words, the radio will “remember” the antenna tuner settings on a per-band and per-antenna basis.
- On some bands – such as 160 and 80/75 meters – the antenna tuner may need to readjust as you go from one end to the other. The radio is capable of remembering the tuning settings of different frequencies across the band.

AGC:

This adjusts the “decay” and mode of the receiver’s AGC (*Automatic Gain Control*).

- **Off.** This disables the AGC. **Do NOT use this mode unless you know exactly how to “ride” the RF gain control at the same time.**
- **Slow.** When a strong signal goes away, the radio’s AGC causes the RF gain to *slowly* drop back down to tracking the background noise level. **This is the mode typically used for SSB and CW operation.**
- **Fast.** When a strong signal goes away, the radio’s AGC causes the RF gain to “quickly” fall back to the background noise level. This is sometimes used for CW operation, but it can make SSB reception sound “harsh” and noisy.

Normal setting: “Slow”

TX Meter:

This allows the selection of what will be displayed **while transmitting** on the main display.

Always set this to “SWR” when you tune the antenna tuner and watch for any briefly-displayed messages that show “High SWR” indicating that the currently-selected antenna-frequency combination cannot be tuned.

- **Power.** This will show the transmitted power. Because of the nature of SSB, it may not easily show the peak transmitted power, but it should be deflecting significantly on voice peaks while transmitting on sideband. For CW, the key-down reading should show the output power.
- **SWR.** This shows the SWR at the current frequency. With the built-in antenna tuner, this should be below 1.5:1, but if it is not, check the following:
 - The radio may have not operated before with this antenna/frequency combination and the tuner settings may not be in its memory. Click on the “**Tune**” button (*top-right on the control panel*) to cause the radio to tune to the current frequency.

- If the radio can't tune on this antenna/frequency combination, an error may show up and/or you will still get a high SWR reading.
- **Comp.** This shows the level of audio compression while transmitting on SSB. For best results – particularly on a noisy band – the speech processor should be enabled, as in:
 - On sliding menu below the display: Both “**Proc In**” and “**Proc Out**” set to mid-scale (*approximately 50*).
 - When you are talking, meter on the frequency display should show about mid-scale on voice peaks. If it does not, check the following:
 - **Mic Gain** (*on the sliding menu below the frequency display*) should be roughly mid-scale at around 50.
 - On **YOUR COMPUTER**, look at the top of the RCForb's window, above the upper-right corner of the main frequency display and look for the “**Vol**” and “**Mic**” settings. As you talk, with the microphone quite near your mouth, adjust the **Mic** setting upwards/downwards to set the the microphone gain on **your** computer.
 - If you set the microphone gain **too high** the sliding waveform display to the left of the **Vol** slider will turn **RED** indicating that your audio level is too high, causing distortion which will result it your voice sounding terrible on the air.
- **ALC.** This shows how “hard” the RF amplifier is being driven. When you talk, this should deflect the meter about 1/3 scale on voice peaks.
 - **If it does not deflect:** Your audio level is **too low** and you are not transmitting with much power. If this is happening:
 - Readjust your **Mic** gain – *see the setting about “Comp”, above* to make sure that the radio's **Mic Gain** setting and the programs **Mic** setting (*which adjust the microphone gain on your computer are set correctly.*)
 - **If it regularly deflects much more than 1/3 scale:** Your audio level is **too high** and will likely sound harsh or distorted on the air. Again, refer to the information in the “**Comp**” setting, above.

Normal setting: ALC or Power, depending on your preference – but you should check **both** when you are setting up.

Tx EQ:

This sets different audio equalization for **transmitted** audio and can help compensate for deficiencies/quirks in the microphone in your phone and/or on your computer.

You should leave this in the “Off” setting unless/until you know, from on-the-air testing, the effects that the various settings have on your audio.

DO NOT try to adjust this setting while listening to yourself live on another receiver or WebSDR system. You will not be able to properly judge your own voice qualities while listening “live” on the air.

Always ask others on the air to judge the settings.

- **Off.** There is no transmit audio equalization. *Unless/until you do on-air experimentations of the setting with other amateurs, leave this in the OFF position.*
- **H Boost1.** This setting is one permutation in which the high frequency audio components are boosted.
- **H Boost2.** This setting is one permutation in which the high frequency audio components are boosted, different from setting 1.
- **F Pass.** Yet another filter setting, affecting transmit audio.
- **B Boost1.** This boost the bass (*low frequency audio*) on transmit audio.
- **B Boost2.** This boost the bass (*low frequency audio*) on transmit audio, but is different from #1.
- **Conv.** An audio equalization that is intended to be optimized for voice conversations.
- **User.** This is a user-defined audio equalization setting. *Refer to the Kenwood TS-480 manual for more information on this setting.*

Normal setting: Off, unless you know a particular setting is appropriate for your microphone/voice.

Rx EQ:

This sets different audio equalization for **receive** audio and can help compensate for deficiencies/quirks in the speaker of in your phone and/or on your computer. Feel free to experiment with the various settings to see which one sounds best to your ears.

This has no effect on transmitted audio.

- **Off.** There is no receive audio equalization.
- **H Boost1.** This setting is one permutation in which the high frequency audio components are boosted.
- **H Boost2.** This setting is one permutation in which the high frequency audio components are boosted, different from setting 1.
- **F Pass.** Yet another filter setting, affecting received audio.
- **B Boost1.** This boost the bass (*low frequency audio*) on received audio.
- **B Boost2.** This boost the bass (*low frequency audio*) on received audio, but is different from #1.
- **Conv.** An audio equalization that is intended to be optimized for voice conversations.
- **User.** This is a user-defined audio equalization setting. *Refer to the Kenwood TS-480 manual for more information on this setting.*

Normal setting: Off.

“Slider” adjustments below the main frequency display:

These adjustments are in a menu below the main frequency display and consists of sliders that can be moved left/right to set their value. Because there are more settings than are visible at once on the screen, there is a “slider bar” on the right side of this display that allows more settings to be revealed by clicking-and-holding the left mouse button on this slider while moving it up and down.

CW Filter Width:

When in CW mode this adjusts the receive bandwidth. *It has no effect in SSB mode.*

At this time, the frequency display in the box to the left of the slider may show nonsensical values.

Note: This control interacts with “FC Shift” - see below for notes and warnings.

Normal setting: 1kHz – and experiment from there.

FC Shift:

This control (*apparently*) shifts the center frequency in both CW and SSB modes. This filter is used together in CW mode with the “**CW Filter Width**” control (*above*).

Initial setting: 1.2-1.3 kHz, for SSB and CW – adjust to suit your taste.

Comment: The frequency display does not seem to properly match what is happening.

Mic Gain:

This does what it says: It sets the microphone gain of the transceiver. In the case of this remote, this control is not particularly useful and *it should always be left at 50%.*

The reason for this is simple: **Your** microphone is *not* connected to the radio – but rather the host computer at the remote site is, so this setting is adjusted not for **your** microphone, but rather the audio level output of the computer and into the radio.

Do not adjust this setting: Instead, use the “Mic” control near the top-right corner of the RCForb display. Remember to “save” the setting (see Figure 4) so that the program “remembers” it when it starts up.

Please leave this setting at 50. If you happen to adjust it, please reset it to 50 when you are done.

CW Speed:

This sets the speed in WPM.

RF Gain:

This control may be a bit difficult for one new at HF operation to understand, but it effectively limits how sensitive the radio can be by setting the bottom limit of the AGC, the status of which is indicated by the S-meter.

A value of “100%” on this radio means “maximum sensitivity” because the S-meter will be allowed to go all the way down to “S-0” where the radio’s AGC is at maximum and the weakest signals may be audible. By setting this control at a lower number, the minimum S-meter reading will be higher. For example, setting the RF gain control at 47% will prevent the S-meter from reading below approximately “10 over S-9” which means that signals weaker than this may be difficult to hear, but signals strong that this will be unaffected.

Why use this? If you are on a round-table conversation or listening to a net and most stations are quite strong you might wish to set the RF gain control down a bit so that the S-meter never gets down as low as the background noise. By doing this, the receiver is quieter when no-one is talking rather than “gaining up” to the point of hearing the background noise and the static crashes.

When in doubt, leave the RF Gain control at 100%.

If, when you connect to the remote station and you hear nothing or many signals are very quiet/weak, check to see if the previous user forgot to reset the RF gain back to 100% and also that the squelch (see below) is set to 0.

RF Power:

This allows the setting of the maximum transmit power.

- **For the Leamington remote:** A full-scale setting correlates with 100 watts PEP
- **For the WA7X remote:** A full-scale setting correlates with 200 watts PEP

For typical SSB operation one would start out by setting the radio to full power, reducing power as appropriate if signals are good.

Squelch:

This is the squelch setting and it should **normally be disabled by setting to 0.**

The usefulness of a squelch on HF is debatable and is not usually very useful owing to the fundamental difference in the way FM and SSB work. On FM it is the “quieting” of the receive signal that sets the squelch and how strong it is has little to do with it directly. On SSB,

measuring this “quieting” is not possible: Unlike an FM signal that stays at constant power as long the mic is keyed, RF output on SSB goes to zero during periods of silence.

On SSB, the squelch is based **solely** on signal strength, but because SSB signals vary in their output power **and** signal levels on HF vary wildly – and static crashes are frequent, particularly in the summer – a squelch on HF isn’t usually very helpful.

If you adjust the squelch, please reset it to 0 when you are done.

If, when you connect to the radio and don’t hear anything, make sure that the squelch is set to 0 *and* that the RF gain is set to 100.

Proc In:

This adjusts the aggressiveness of the speech compressor.

A typical setting for these controls is in the range of 25-30.

Monitor Level:

This control should be set at zero: It will likely be removed from the control panel.

NR Level:

This control adjusts the aggressiveness of the DSP noise reduction which is active as set by buttons **DNL1, DNL2 or DNL3**.

A setting of 0 has less effect while a setting of 9 is so strong that it will adversely affect intelligibility in many cases. Adjust this setting to suit your taste under the prevailing band conditions.

Noise reduction should never be used when trying to receive any digital mode as it may “corrupt” the audio and make reception of digital signals impossible.

Buttons to the right of the main frequency display:

The TX button (labeled “TXd” on the WA7X remote):

Pressing this button (*and making it turn orange*) will cause the radio to enter transmit mode.

In sideband, the receiver will be muted but no RF power will be produced unless there is transmit audio.

In AM, the receiver will be muted and the radio will produce a resting carrier at 20-30% of the power set by the “RF Power” control which is modulated to 100% of that power by transmit audio.

In CW mode the receiver will be muted and the transmitter will do **nothing**. In other words, one cannot use the CW mode and the TX button to generate a CW carrier for triggering the antenna tuner.

PWR:

This is a “soft” power button that will turn the radio on/off. If you see “PWR Off (see Figure 4) click on this button to turn the radio back on.

Tune:

Clicking this button will cause the antenna tuner to find a match for the current frequency and antenna selection.

For the Leamington remote: This button triggers the auto-tuning of the TS-480’s built-in tuner.

For the WA7X remote: *On antenna #1 only* -This button causes the radio to transmit a low-power signal to cause the external antenna to be triggered to match the antenna at that frequency.

IMPORTANT: ALWAYS press the TUNE button on the WA7X remote **BEFORE** you transmit to check the VSWR and cause the external tuner to match to the antenna . You must do this when changing bands, or moving across the band from the last place on which you transmitted.

Because there is no tuner connected to antenna #2 on the WA7X remote, this button cannot tune the antenna.

Important:

- **The built-in antenna tuner in the TS-480S at Leamington CANNOT be enabled on 160 meters – use the end-fed half-wave (antenna #2) for this band.**
- **Always set the “TX Meter” control to “SWR” when you tune the antenna tuner and watch for any briefly-displayed messages that show “High SWR” indicating that the currently-selected antenna-frequency combination cannot be tuned.**

Note: For this to work, the **Auto Tune** selection must be either “**Both RX and TX**” or “**TX Only**”.

A/B:

This swaps the frequencies/modes in the “A” and “B” VFOs.

A=B:

This copies the frequency/mode of the “A” VFO into the “B” VFO.

ATT:

This inserts a 20dB attenuator in receive when enabled. ***This is normally turned off.***

Pre:

This enables an RF preamplifier when on. ***The only bands where this may help would be 10 and 6 meters.***

This is normally turned off.

BC1:

This enables “Beat Cancel” mode 1 when turned on which automatically removes CW carriers and heterodynes. Only BC1 ***or*** BC2 can be enabled at a given time.

BC2:

This enables “Beat Cancel” mode 2 when turned on which automatically removes CW carriers and heterodynes. Only BC1 ***or*** BC2 can be enabled at a given time.

Modes 1 and 2 are similar in operation, but one would try both in a particular situation to see which has the desired effect.

DNL1:

This enables mode 1 of “Digital Noise Limiting”. ***Only one of the “DNL” buttons can be on at a given time.*** Each of the three digital noise limiting modes operates differently: Try each one in a given situation to see which works best.

DNL2:

This enables mode 2 of “Digital Noise Limiting”. ***Only one of the “DNL” buttons can be on at a given time.*** Each of the three digital noise limiting modes operates differently: Try each one in a given situation to see which works best.

DNL3:

This enables mode 2 of “Digital Noise Limiting”. ***Only one of the “DNL” buttons can be on at a given time.*** Each of the three digital noise limiting modes operates differently: Try each one in a given situation to see which works best.

NB:

This enables the noise blanker, which can be effective for certain types of static and “popping” noises from power line interference.

NR1:

This enables mode 1 of the digital noise reduction, the strength of which is adjusted using the **NR slider**. ***Only NR1 or NR2 can be enabled at a given time.***

Try both modes and different settings of the NR slider to see which works best for a particular situation.

NR2:

This enables mode 2 of the digital noise reduction, the strength of which is adjusted using the **NR slider**. ***Only NR1 or NR2 can be enabled at a given time.***

Try both modes and different settings of the NR slider to see which works best for a particular situation.

Split:

This enables “Split” mode in which the “main” VFO (*which could be A or B depending on the “A/B” button*) is used for transmitting and the “other” is used for receiving.

DO NOT OPERATE IN SPLIT MODE UNLESS YOU KNOW EXACTLY WHAT YOU ARE DOING!

Operating with **SPLIT** mode on can result in your accidentally transmitting over the top of another QSO, or even in a section of a band where SSB is not allow.

Make sure that this is turned OFF unless you are using SPLIT mode, and please turn it off again when you are done.

The following buttons appear only when your mouse is hovering over the upper buttons.

* * * * *

VOX:

This enables voice-activated keying. ***It also enables the transmitter for CW keying.***

This is NOT useful for remote-control SSB operation.

Important:

For CW operation, the VOX MUST be activated: If you don't do this, the radio may seem to go into transmit mode, but it will not transmit.

Proc:

This button enables the audio speech compressor (*when the button is yellow*) which can greatly reduce the peak-to-average ratio of the RF transmit power, adding more “punch” to the transmitted audio.

For casual operation, it is recommended that this be turned on as it can make a significant difference in intelligibility. For “armchair copy” (*e.g. very strong*) signals or in some roundtables others may request that you turn it off.

The compressor can help maximize the transmit effectiveness if the user's microphone gain is too low, but if the microphone gain is too high it is likely that it will cause background noise and echos in the user's local environment to be picked up and be very annoying to those listening and in extreme cases, it can cause your transmitted audio to sound ***very bad!***

The “strength” of the speech processing may be adjusted using the **Proc In** slider: A setting around 30 is an appropriate starting point..

Section 6: Setting up for and operating using SSB

Initial settings for SSB:

- **Mode:** For voice, USB for 20 meters and higher, LSB for 40 meters and lower, USB on 60 meters.
- **Pre Amp: Off**
- **Atten:** Off – not selected (not yellow)
- **Pre:** Off – not selected (not yellow)
- **Power:** Normally 100W
- **RF Gain:** 100%
- **Mic Gain:** 50%
- **FC Shift:** 1.2-1.3 kHz
- **SQL (squelch):** 0
- **NR Level:** Normally 0
- **NR button:** Off – not selected (not yellow)
- **ANF button:** Off – not selected (not yellow)
- **Proc (speech processor):** On - selected (yellow)
- **Split:** Off – not selected (not yellow)
- **Tx EQ:** Off
- **AGC:** Slow
- **VOX:** Off – not selected (not yellow). *This doesn't work for remote operation, anyway.*
- **Auto Tune:** Both RX and TX
- **Antenna:** One (*Unless antenna "Two" exists and is connected*)

Important: It may be necessary to transmit a carrier to allow the automatic antenna tuner to do its job. **See the section "tuning the antenna".**

SSB Transmit Troubleshooting

- **Not transmitting?** (*No power, cannot be heard*)
 - Check **Mode** (LSB/USB according to freq.) - it should NOT be CW
 - **RF Power** slider should be higher than zero
 - Check **Mic Gain** on radio slider: Set to approx. 50%
 - Check "**Mic**" at top of program window – increase gain if oscilloscope line is flat. If it is still flat after increasing the VOL slider, check your computer's mic gain/connection. **Remember:** Once you find the proper **Mic** setting, you must go into the audio menu and save it (*see Figure 4*) or else it will be reset to default every time you start the program.
 - Check **MIC** setting in program (top, far left with drop-down selection) to verify correct audio source
 - Did you transmit for more than **180 seconds/3 minutes** at once and trigger transmit time-out? Switch back to receive and then try not to be so long-winded next time!

- If you are using RCForb Ver 0.9, MIC audio may not work on some computers – try Ver. 0.8, instead.
- Is the band that you are on dead?
- Try tuning yourself in on a WebSDR to see if you are getting out (<http://websdr.org>).

Section 7: Setting up for and operating CW

Initial settings for CW operation:

- **Mode:** CW or CW-R
 - In Icom convention the dial frequency is that of received signal and **not** of that of the “zero beat” frequency.
 - On Icom transmitters, the receiver offset on CW is LSB for frequencies below 10 MHz and USB for frequencies above 10 MHz. CW-R mode reverses this convention.
- **VOX:** On – selected (yellow). **Transmitter will not output power unless the VOX is turned on.**
- **Pre Amp:** Off
- **Power:** Normally 100%
- **RF Gain:** 100%
- **SQL** (squelch): 0
- **FC Shift:** 1.2-1.3 kHz as a starting point.
- **CW Filter Width:** 0.8-1.2 kHz as a starting point.
- **NR** button: Not selected (not yellow)
- **BC1** and **BC2** buttons: Not selected (not yellow) – **Important – do not activate these when using CW.**
- **Pre Amp:** Off
- **Atten:** Not selected (not yellow)
- **Pre:** Not selected (not yellow)
- **Power:** Normally 100W
- **RF Gain:** 100%
- **SQL** (squelch): 0
- **NR Level:** Normally 0
- **AGC:** Slow
- **Auto Tune:** Both RX and TX
- **Antenna:** One (*Unless antenna “Two” exists and is connected*)
- **CW Filter Width:** Adjust for your preference.

CW operation using direct keyboard entry:

- Select the desired **CW** mode (e.g. CW, CW-R)
- Click on the CW tab at the extreme bottom-left of the program window and type the text you wish to send where it says “Type a message”.
- Use the **CW Speed** slider for sending speed.

CW operation using a local paddle:

It is possible to use a paddle connected to your computer rather than relying on the “text to Morse” input. Doing this requires that your local computer has a working serial port (*a USB-to-serial interface is fine*).

The paddle configuration may be found in the **Options**→**Control Devices Setup** menu under the **External CW** tab. In this one may select the serial port being used and the pins used for DIT and DAH.

Note: The external keying interface in RCForb 0.8x is rather primitive, lacking buffering and lmbic operation. It is reported that the CW interface for attached keys and paddles in RCForb 0.9x is improved over that in 0.8x.

“External” CW filtering:

Please note that the TS-480 has a “CW Filter Width” mode that may be used to customize the receive bandwidth along with the “FC Shift” slider to set the passband center.

While it is far preferable to use the radio’s band-pass filtering to maximize signal dynamics, an external audio filter may be used at the computer of the remote station user. In addition to using a standard CW audio filter connected to the computer’s audio output (*e.g. a device made by MFJ, Ten-Tec or others*) it is possible to route the receive audio through a computer program that does filtering.

One such program is “[Spectran](#)” - a general-purpose audio analysis and waterfall display program that also includes the ability to set arbitrary band-pass and band-reject filters. The operation of this program is beyond the scope of this document, but general operation of this program as a means of filtering audio is discussed on the page “[Using your computer to ambush unsuspecting NDBs](#)”.

The difficulty with using a program on the same computer to provide filtering is that of routing the audio from the speaker output back into the computer. While this could be done with a **second** sound card (*possibly running on another computer*) and some audio cables connected to it, a program like “Virtual Audio Cable” could be used to make virtual sound cards.

As an example, RCForb could be configured using Virtual Audio Cable to send its audio output to “Virtual Cable 1” and the Spectran program could then be configured to use “Virtual Cable 1” as its input and then output the filtered audio to the speaker. The downside to this is that the Virtual Audio Cable program currently costs \$35: There may be “free” programs out there that do similar things, but the author cannot vouch for their usefulness or “safety”.

With the RCForb audio routed to Spectran, audio filters may be set up – plus its native waterfall display will show signals across the audio spectrum from the remote receiver.

Another programs with similar features is [DL4YHF's "Spectrum Lab"](#). This program is powerful and feature-laden and it is somewhat complicated: Please refer to online resources for advice on how to use it.

Section 8: Operating digital modes

At present, the transmission of digital modes via the HF remote is not permitted.

In theory, it is possible to operate digital or other “sound card” modes (*FT-8, RTTY, SSTV, PSK-31, etc.*) via the remote, but there are a few things that need to be considered, including:

- **Internet delay/dropouts.** While it is possible to send audio over the Internet that contains the modulation, one must consider that audio sent via the Internet has variable delays and occasional drop outs. Some modes (*FT-8, WSPR, etc.*) require nearly perfect timing and conveying the audio from a remote location via the Internet may result in “uncopyable” transmissions on transmit and/or receive.
- **High transmit duty cycle.** Most digital modes transmit a constant amount of power for a significant duration so it is recommended that reduced power (*a few 10s of watts at most*) be used to avoid thermal stress on the transmitter. With the radio being used at this time this presents a problem as there is no easy way to monitor the transmit power.
- **Routing of the user’s program/s audio to/from the remote.** By default, the RCForb program uses the computer’s speaker and microphone connections for receive and transmit audio.
 - Programs used for digital modes must have **direct** connections (*via cables or some “virtual” sound card routing*) to the receive and transmit audio.
 - When transmitting digital modes one **must not** use acoustical coupling. In other words, you may not place the radio’s microphone near the speaker. Attempts to do this not only result in poor-quality transmission, but spurious signals like audio harmonics, background noises and “computer” sounds (*dings, bells, notifications*) are likely to be transmitted as well.
 - The use of a remote station complicates matters as there is no physical cable connecting the radio. A work-around is to use a “virtual” sound card as afforded by programs like “Virtual Audio Cable” (*\$35.00 at the time of writing*) to allow internal routing of audio paths. *This is briefly mentioned in Section 7 of this document.*
 - Care must be taken to avoid routing the computer’s operating system audio to prevent the accidental transmitting of things like system/email notifications, audio from web sites and music that one might play on the computer.

For the reasons listed above, the transmission of digital modes via the remote HF station is not permitted at this time.

We hope that we will be able to allow such operation someday, but this will require some changes in the on-site hardware – and possibly a different HF transceiver. *If you wish to experiment with these modes in the meantime, please do so **only** with the permission of the HF station manager and after appropriate testing has been done with your proposed set-up.*

Section 9: Activating the automatic antenna tuners

Important:

The antenna tuner at the Leamington remote operates differently from that of the WA7X remote: See the relevant sections, below.

The antenna tuner on the Leamington Remote:

- The TS-480S's built-in antenna tuner *cannot be activated on 160 meters.*
- Always set the "TX Meter" to "SWR" when you tune the antenna tuner and watch for any briefly-displayed messages that show "High SWR" indicating that the currently-selected antenna-frequency combination cannot be tuned.

The Leamington HF remote station uses a G5RV wire antenna as "**Antenna 1**" and while this antenna has "reasonably low" VSWR on *most* hf bands, it isn't low enough to keep a solid-state transceiver "happy". Because of this, there is an automatic antenna tuner located at the "radio end" of the feedline to present a 50 ohm match to the transceiver.

Connected to "**Antenna 2**" on this remote is an end-fed half-wave cut for 160 meters and as such, it is capable of operating on the lower half of the 160 meter band and much of the 80 and 40 meter bands: It *may* tune on other bands, but the performance may or may not be good, so it is suggested that *both* antennas be tried.

Remember, the antenna tuner does not just match the antenna alone, but it matches the "Feedline+Antenna" rather than *just* the antenna and because of the rather long length of the feedline, there may be some bands on which a match is available, but the losses of the feedline reduce the radiated power from the antenna enough to make operation difficult.

In most cases, the antenna tuner will automatically detect the frequency of operation and if it has "memorized" a match at or near that frequency, it will pre-set the tuner with the last-known settings – but this doesn't always work!

The TS-480S has a built-in antenna tuner which "remembers" its settings from the last time a particularly frequency/antenna combination was used, but if you are tuning to a frequency where the radio hasn't yet been – or if there has been a change made to the antenna – you will need to cause the antenna to tune.

When you setting up to transmit, it is recommended that for the first transmission that you change the setting of the **Tx Meter** to "**SWR**" and observe the reading when you first transmit. If the VSWR reads higher than 1.5:1, stop transmitting and press the **Tune** button. If all goes well, the audio will be muted for a couple of seconds (*at most*) and the tuner will find a match.

If, for some reason the tuner does **not** find a match (*you may see that error in the “faults” window below the drop-down selections on the left side of the frequency display, or you may not get a better SWR than before*) then it is likely that one of the following has happened:

- The **Auto Tune** setting was set to **Off**
- The tuner could not find a match to this particular antenna/frequency combination. If this happens, ***you will not be able to operate with this particular frequency/antenna combination.***
 - If you know that this combination had worked in the past, re-check your antenna and frequency selection. If you have verified that it is correct, contact a UARC officer to let them know that there may be a problem.
- You may have inadvertently tried to transmit on a frequency outside an amateur band. This radio/system will not allow this.

Important:

- While you may receive on 160 meters with either antenna, the antenna tuner and antenna ***will not match*** on 160 meters on antenna #1 at all, so please do not attempt it – use antenna #2, instead!
- The TS-480 has **two** antenna ports: The first port is connected to the G5RV but the second port is connected to a feed that can be switched between the 160 meter End-Fed half-wave **or** the ALS-2010 log periodic. While this switching is done automatically, this means that as far as the radio is concerned, there are only two antennas. Because the radio’s tuner can “remember” the settings for the tuner on a “per-frequency, per antenna” basis, it will already “know” the different settings for 40 meters on the G5RV and 40 meters on the End-Fed half-wave. Because there are *two* antennas on the second port that can work on 20 meters (*the End-Fed half-wave and the beam*) you should always use the “TUNE” function **before** transmitting to make sure that the radio is matched to the antenna that is selected.

The antenna tuner on the WA7X Remote:

- **The TS-480HX at the WA7X remote does *not* have a built-in antenna tuner connected to antenna #1, which feeds an offset-fed dipole.**
- **There is NO antenna tuner on antenna #2: This port is connected directly to an 80 meter end-fed half-wave.**
- ***Always set the “TX Meter” to “SWR” when you tune the antenna tuner and watch for any briefly-displayed messages that show “High SWR” indicating that the currently-selected antenna-frequency combination cannot be tuned.***

The HF remote station uses an offset-fed dipole antenna, fed with window line, via an external tuner for antenna #1. Because window line is used to feed this antenna, the VSWR may be extremely high without incurring losses which allows this antenna to be used on most amateur bands.

Because this antenna tuner is external, ***you must*** push the “TUNE” button ***every time one changes bands***. In most cases, the antenna tuner will tune very quickly if it has “memorized” a match at or near that frequency from previous operation.

When you setting up to transmit, it is recommended that for the first transmission that you change the setting of the **Tx Meter** to “**SWR**” and observe the reading when you first transmit. If the VSWR reads higher than 1.5:1, stop transmitting and press the **Tune** button. If all goes well, the audio will be muted for a couple of seconds (*at most*) and the tuner will find a match.

If, for some reason the tuner does **not** find a match (*you may see that error in the “faults” window below the drop-down selections on the left side of the frequency display, or you may not get a better SWR than before*) then it is likely that one of the following has happened:

- You tried using the tuner on antenna #2: ***There is no tuner on antenna #2!***
- The tuner could not find a match to this particular antenna/frequency combination. If this happens, ***you will not be able to operate with this particular frequency/antenna combination.***
 - If you know that this combination had worked in the past, re-check your antenna and frequency selection. If you have verified that it is correct, contact a UARC officer to let them know that there may be a problem.
- You may have inadvertently tried to transmit on a frequency outside an amateur band. This radio/system will not allow this.

Important: While you may receive on 160 meters on the WA7X remote, none of the antennas on site are currently cut for this: ***Please do not try to transmit on 160 on the WA7X remote.***

Note that it is usually possible to remotely “hear” one’s own transmission via a WebSDR site (*go to: <http://websdr.org> to find one in your general area*) but note that the closest WebSDR may be “too close” for ionospheric “skip” from the remote site, depending on frequency, prevailing propagation conditions, time of day, etc. so you may have better luck using one farther away.

Section 10: Rules for operating the UARC HF remote station

When using this remote station on *any* mode:

- ***Before transmitting***, verify that you are on a frequency that is appropriate for your license class. ***You may not transmit on a frequency that is not consistent with your license or license class, and you may not transmit until given permission to do so by a UARC officer.***
- **Always be courteous on the air:**
 - Do not tune up atop an ongoing conversation.
 - You do ***not*** own a frequency, so please yield to nets that may routinely use a particular frequency.
- Users of the site will use their ***own*** call signs. However, we request that at the beginning and at the end of your session you transmit ***“This is <your call sign> using the UARC, W7SP club remote radio site.”*** Please do this only on a clear frequency that is commensurate with your license class.
- We ask that users limit extended use of this unique resource. If possible, limit each session to about an hour. If others want to use the site, there is a dialogue box on the screen they can use to request use. We leave it up to you to use the site responsibly. Remember that HAMS are courteous, please share!
- If ***ANY*** anomalous event occurs while you are operating this radio you are to report the details to the UARC President within 24 hours by email or telephone. If you are unable to reach the President, contact another member of the UARC Board, names and contact information is available on the UARC web page: (<https://user.xmission.com/~uarc/cluboff.html>)
 - The above includes an apparent malfunction or problem with the radio or an accidental transmission on a frequency that is not covered by your amateur radio license.
 - ***All operation on this remote site is logged in great detail.***
- The grid square for the Leamington site is **DM39** and that of the WA7X station is **DM49**. We request that only this 4 digit grid square be used.
 - While grid squares are commonly used on digital modes and on 10 meters, they are not usually used on other HF bands.

How to get access to this station:

If you wish to obtain access to this station, there are a few prerequisites:

- You must be a member of the Utah Amateur Radio club in good standing or receive “special dispensation” on a case-by-case basis by the UARC president.
- If you wish to transmit from this station, you must have a current **General Class** or higher amateur radio license. *(You do not need a license or even the club’s permission just to listen, but someone with permission to transmit can “take” the tuning of the radio away from someone without.)*
- You must contact the president of the Utah Amateur Radio Club and request access to the station.
- You must read and agree with the “[Guidelines for use of the UARC Remote HF Radio Station](#)” document.
- If you have other questions, feel free to contact the HF station manager at: hfmanager@utaharc.org

Section 11: Frequently-asked questions (FAQ)

- “How do I get access to these station?”
 - Please read Sections 1 and 10 of this document.
- “How can I help make these stations better?”
 - If you are willing to donate time, equipment and/or money, we would be happy to talk to you! Please contact the HF station manager via email (*contact information on page 1*) if you wish to help.
 - If **you** have a decent HF station that you might be interesting in making remotely available to UARC members (*when you aren't using it, of course*) we would like to hear from you.
 - The WA7X station is owned and operated by Glen, WA7X: Contact him directly if you wish to help out with that station.
- “Can more than one person use a station?”
 - **Yes** – but there are limits.
 - Many people can listen at once to the receiver, but remember that there is only **one** receiver and only **one** person can have control of it and tune it at a time. In other words, **everyone** will be listening to the same thing.
 - It is possible for several people to be able to use the transmitter, but there are several caveats:
 - Because there is only one radio, transmitting can be done only on the frequency and mode to which the radio is set.
 - Only one person at a time can transmit: *When someone else transmits, you will be able to hear their audio over your speaker.*
 - Allowing multiple parties to transmit is useful for a net or round table where several of the users on the remote may wish to check in or talk, one-at-a-time.
 - If you only wish to receive there are many Internet-accessible receivers around the world: Go to the **websdr.org** site for a list of remote receivers world-wide that allow many users at the same time to tune their own “virtual” receiver independently of each other.
 - **Remember:** There are **two** remote stations available to UARC members so don't forget to check the “other” station if one is already in use.
- “I can't hear anything at all on the receiver, not even hiss – what's wrong?”
 - **Make sure that you are connected to the receiver.** If you can tune the dial, you are probably connected.
 - **Make sure that your computer's sound is working:** Try playing music/video. Make sure your computer's audio isn't muted, its volume isn't all of the way down and, if you are using external speakers, that they they are turned on.
 - **The “Vol” slider at the top of RCForb may be all of the way to the left:** Try turning it up.
 - **Check the “SQL” slider on the radio:** Make sure that it is at zero to disable the squelch.
 - **Check the “RF Gain” slider on the radio:** Make sure that it is set to 100.

- **“When I am talking on the radio people are telling me that I sound terrible/quiet/noisy – what’s wrong?”**
 - Make sure that you do **NOT** use your computer’s internal microphone: These are almost always terrible and tend to pick up noises from the room you are in, the computer’s fan, its hard drive and echoes.
 - If you are using the Android app, people have had good luck using the microphone build into their smart phone as long as it is not being used as a “hands free” device: The microphone should be very close to your mouth. **Do not use “hand’s free” mode.**
 - If you have multiple microphones – including a remote Bluetooth – it may be that your computer/device isn’t using the microphone that you expect. For example, if you are using your Android device in a vehicle, it might be the car’s microphone that you are using rather than the phone’s – and this will likely pick up a lot of extra noise.
 - *If you are using an Android device, the microphone that you are using may unexpectedly change: This can happen if you receive a telephone call or use another app while the RCForb application is running.*
 - When you are talking, pay attention to the moving audio bar at the top of the RCForb’s display: The bar should be wider than a single black line while you are talking – the wider, the more audio you have. If you run too much audio, the bar will change color on excessive peaks: It’s OK for it to change color *occasionally* but if it’s almost always red while you are talking you need to reduce the microphone gain **on your computer.**
 - The RCForb program **DOES NOT** “remember” the previous **Mic** setting (*the slider bar at the top of the screen*) unless you go into the audio menu and save it. Once you have found the proper **Mic** setting for your computer/microphone combination, go to: **Options->Audio Device Settings** and click the **Save** button at the bottom-right of the pop-up window. Doing this will cause the program to remember the **Mic** setting. *You will have to do this on every computer that you use with this program – and the settings will be slightly different.*
- **“What antenna is used for this remote?”**
 - The “Overview” section near the beginning of this document describes the stations and their antennas.
- **“Is there a web camera of this remote that I can look at?”**
 - **For the Leamington station:** Yes, there is a camera that looks at the radio and the antenna tuner. Its access and capabilities are very limited: *Please contact the HF station manager for more information.*
 - **For WA7X’s station:** There are a number of cameras at <http://wa7x.com>
- **“Can I use a digital mode like FT-8 on this remote?”**
 - Not at this time – please read Section 8 of this document to find out why.
- **“Is there a waterfall display like I see on other sites?”**

- Not at this time. We are investigating possible means of providing this, but in the mean time you can use one of the many WebSDR sites. For a worldwide list and map of WebSDR sites go to websdr.org.
- The end of Section 7 of this document mentions the use of the “Spectran” program which could be used to provide a waterfall display of the signals within the audio passband. Because only the audio passband is available remotely, this display cannot show signals above and below where the receiver is tuned.
- **“I want to run CW – is there a narrow filter?”**
 - Yes: You may adjust both the “CW Width” and the “FC Tune” controls to find the bandwidth/frequency combination best suit your taste.
 - See Section 7 for a possible work-around using the “Spectran” (*or similar*) program.
- **“What are the ways I can send CW?”**
 - Please refer to Section 7 for more information, but in short:
 - Use the “text-to-Morse” interface built into RCForb.
 - Connect a paddle to your local computer via a serial port.
 - Note: RCForb 0.9 has better CW support for paddles/local key than version 0.8.
- **“I’m transmitting, but I can’t seem to get out! What’s wrong?”**
 - This could be due to any number of things, including:
 - You haven’t caused the antenna tuner to tune to your frequency – *See section 9 of this document.*
 - You are trying to operate on a band that can’t be matched with the tuner – please read the “Overview” and section 9 of this document.
 - Your microphone isn’t working: If you don’t see movement on the “audio bar” at the top of the screen when you talk you’ll need to troubleshoot your computer – *See section 2 for links to documents that provide troubleshooting information.*
 - You may be using RCForb 0.9: For some reason the “mic” audio just doesn’t work on some computers – try RCForb 0.8, instead.
 - Make sure that you have selected USB or LSB (*as appropriate for the band*) if you are using SSB. If “CW” is selected, the radio will *appear* to transmit, but nothing will actually happen.
 - The band you are on may be dead: If you don’t hear other signals, there may be no propagation to your location at that time of day on that band. Sometimes solar flares will quash all HF communications for hours/days.
 - **In general:**
 - 160 meters – Nighttime – long distances are possible, “local” (within 250 mile radius) during the day. ***Receive-only operation is possible with this remote at this time.***
 - 80 meters – Nighttime – long distances are possible, “local” (within 250 mile radius) during the day
 - 60 meters – Often open during the day, better at night.
 - 40 meters – Open night or day. During the day, useful from about 250 to 1000 miles, much greater distances at night.
 - 30 meters – (Digital/CW only) – Open at medium/long distances day/night.

- 20 meters – Usually better propagation during the day than at night, particularly during low sunspot cycles, but conditions are improving as the solar cycle is on the upswing.
 - 17 meters – Mostly daytime – openings are somewhat rare during low sunspot cycles, but conditions are slowly improving as the solar cycle is on the upswing.
 - 15 meters – Mostly daytime – openings are somewhat rarer than on 17 meters during low sunspot cycles, but conditions are gradually improving as the solar cycle is on the upswing.
 - 12 meters – Mostly daytime – openings are even rarer than on 15 meters during low sunspot cycles, but conditions are generally improving as the solar cycle is on the upswing.
 - 10 meters – Openings are rare during low sunspot cycles but “Sporadic-E” openings may occur any time of day or night – particularly in the spring. Conditions on 10 meters are rapidly improving as activity increases during this solar cycle
- **“Is there a linear amplifier at the remote site that we can use?”**
 - No.
 - **“The audio sounds all ‘warbly’ - as if I’m listening underwater: What’s wrong?”**
 - It’s possible that a previous user has turned on the DSP noise reduction (*the “NR” buttons*) and set the level too high via the “NR Level” slider. Set the NR Level slider to something lower than 15 or so and/or click the “NR” button to turn it off.
 - If the “NR” isn’t on and you are listening to signals on a higher band (*e.g. 20, 17, 15, 12, 10 meters*) it is possible that the signals that you are hearing are being affected by propagation. Signal from Europe which traverse the North Pole are often affected this way – particularly if there has been recent solar activity.