

IRBHost Amateur Station Remoting Software

Updated for Version 6.001

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1.0 Overview

This file documents the IRBHost software written by Stan Schretter, W4MQ. This software is used to provide the host. I.e. radio station end, for a system that supports control and operation of an amateur radio station via the Internet. Client software to provide the local interface to a control operator via the Internet is currently available from W4MQ in three formats:

- WebXCVR - a standalone application that is downloaded and installed on each computer
- IRB Web Interface - A fully interactive web browser interface for IE5.x and later
- PocketXCVR – A pocket PC interface

This software suite is intended to provide easy access to remote operations for any amateur having a radio that can be interfaced to and operated by a computer. Generally, if your radio supports a logging program or can be controlled for frequency and mode by a Dx Cluster program or PSK program, then it can be remotely controlled via this software.

Several separate pieces of software and hardware are required to fully control and operate the amateur station:

- A radio that can be controlled via a computer. Possibly an amplifier, rotator, and antenna switch that can be controlled totally via a computer interface.
- A computer running Windows XP or possibly Windows 2000. The server capability used at W4MQ is a very inexpensive older E-Machine with an 1800MHz Celeron processor and 256Mbytes of memory. Basically ANY configuration that supports Windows XP is sufficient for the IRBHost and IRB Sound software.
- IRBHost by W4MQ acts as the remote user interface, radio, and amplifier controller, and provides overall integration of operations;
- A separate Voice over IP program provides the two way audio between the remote user and the radio. Currently three VoIP programs are fully supported by IRBHost
 - IRB Sound by W4MQ
 - Skype
 - Echolink
- Two rotator control methods are supported:
 - ARS, a standard rotator control system by EA4TX can manage up to four separate rotators, including Az/EI systems to support satellite operations.
 - The Hygain DCU controller and systems that use the same control schema, e.g. Idiom Press interface is supported
- Easy selection of antennas from your "antenna farm" is also integrated into the software and can be implemented using a standard antenna switch remotely controllable by the control operator. The IRBHost software will support radio configurations (like the TS2000) with up to two HF/6m antenna ports, one radio RX only antenna port, and separate VHF and UHF antenna ports. A total of 12 separate antennas can be defined. Up to five antennas are selectable per band by a remote control operator. Allowed frequency ranges for each antenna/band combination can be defined, as well as antenna tuner options.
- An impedance matching network between the radio and the computer sound card is needed to insure quality audio.

The IRBHost software will interface directly to Kenwood TS2000, TS480 and TS570 radios and indirectly to most other computer enabled radios via the DxLab Commander program by AA6YQ.

The IRBHost also can interface to the Alpha 87A amplifier. This operation is totally integrated and transparent to the control operator

1.1 Internet Connection

The IRBHost works best on a broadband connection, but will work (using the IRB Sound only) on a dial up connection.

If your Internet address is not fixed by your ISP, e.g. 13.14.123.567-- a static connection, then you must use an IP to URL mapping service such as www.no-ip.com to provide users with a fixed URL for your dynamically assigned and changing Internet address.

The IRBHost REQUIRES that the following ports be forwarded through your router and/or firewall directly to the computer running the IRBHost2 software

- UDP 47701 Control and Status In
- UDP 47708 IRB Sound In
- TCP 47880 Built-in Web server port

1.2 Software

The following software is used to support the Remote operations:

- IRBHost: download from www.w4mq.com
- Voice over IP: Skype www.skype.com.
- If you are using the ARS rotator system: WinARS by EA4TX; www.ea4tx.com
- Echolink; www.echolink.org
- DxLab Commander (for non-Kenwood radios): www.qsl.net/dxlab
- Port95NT.exe: The driver supporting the parallel ports for relay control, etc.

The latest version of the IRBHost software can be download from www.w4mq.com. The download will automatically install into the c:\Program Files\W4MQ\Remoteserver directory on your computer. You may override this selection and place the software into any directory of your choosing. All programs required to operate the IRB host are in that directory. The software will also create a sub-directory \remote where the programs needed to support the web browser mode of operation are stored.

The main program for the IRBHost software is named IRBHost2.exe and should be 'pinned' to your computer "Start" menu and placed in the Startup folder so it starts whenever you reboot your server.

If you are using a parallel port relay board to control antenna switching, etc then you should download and install the Port95NT.exe driver program. It can be found at www.w4mq.com/server/port95nt.exe

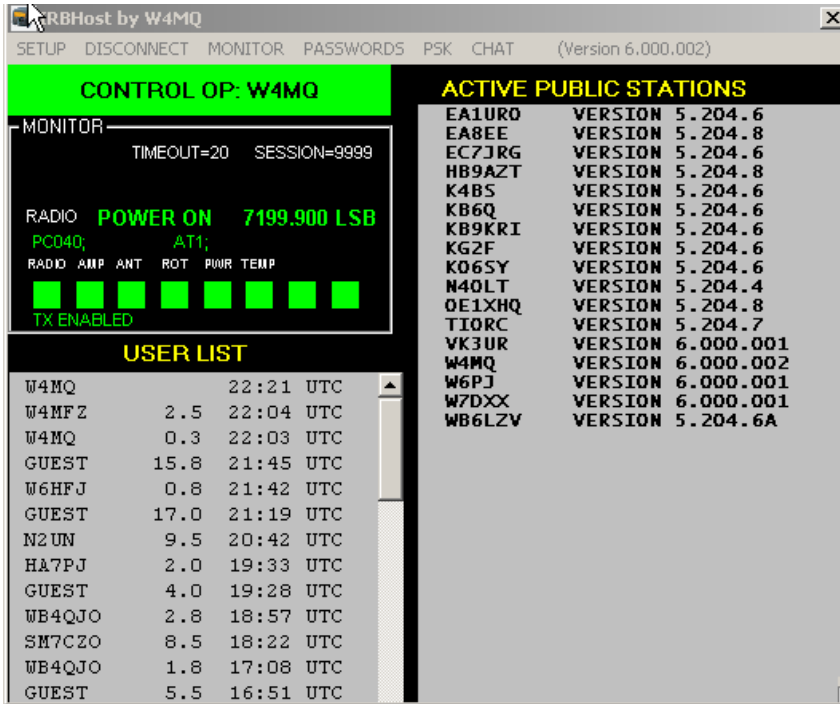
The software directory contains the following:

```
../Program Files/W4MQ/Remoteserver
  Ack-reg.txt, ack-reg2.txt      Text files used by password maint for email response
  Cty.txt                       Prefix mapping and lat, long information
  Irbhost.ini                   Configuration file for IRBHost
  Irbhost2.exe                  Executable
  Irbsound.exe                  VoIP program
  Log.txt                       Control operator logon info
  Passwords.csv                 Password file used by the password maint software
  Xmitlog.txt                   Control operator transmit log
  Websites.txt                  Used to generate web browser interface start page

../...../Support directory
  Windows and PSK DLLs and other support programs

../...../remote directory
  web files to support web browser interface (flash.html, radio.html, cw.html, udptx.class)
  web files to support status via the web (userlist.html, websites.html)
```

1.3 IRBHost Interface Overview



The IRBHost user interface consists of several separate windows:

- The main window shown above
- The monitor and local control window initiated via the “MONITOR” menu item. This window is a version of WebXCVR specially configured to work with the IRBHost and has all the features of the WebXCVR application.
- An amplifier monitor window is available whenever an amplifier configuration is defined
- The password maintenance window used to maintain the ‘password.csv’ file
- The Windows Notepad application window will pop up when the EDIT CONFIG FILE function is selected from the Setup menu item.
- The PSK monitor window selected via the PSK menu item.
- The text Chat window is selected via the Chat menu item

In addition the ACTIVE PUBLIC STATIONS display area doubles as a display area for the IRBHost configuration information. Information of all setup parameters is available by selecting the Setup -> ONLINE DATA menu item. Clicking the setup data display will return the ACTIVE PUBLIC STATION display to the forefront.

1.3.1 IRBHost Display

The main display is used primarily to monitor the remote operation and to edit the configuration file and password information. The only 'actions' that can be taken from this display is to DISCONNECT the current user by clicking the DISCONNECT menu item or to initiate a text chat session with the connected operator by clicking the CHAT menu items.

MENU

SETUP MENU

- Displays this document
- Initiates a text editing window for the configuration file (irbhost.ini)
- Allows selection of the configuration items for viewing

DISCONNECT

- Immediately disconnects control operator

MONITOR

- Initiates WebXCVR monitor and local control interface

PASSWORDS

- Initiates the Password Maintenance window that allows editing of the 'passwords.csv' file

PSK

- Initiates the PSK waterfall monitor

CHAT

- Initiates the text chat window

CONTROL OPERATOR STATUS

AVAILABLE (Yellow)

CONTROL OP: Callsign (Green)

MONITOR AREA

TIMEOUT

- Minutes until timeout (automatic logoff) due to NO commanding from control operator

SESSION

- Minutes remaining in the current control operator session

RADIO

- Key radio paramaters: AC Power, frequency and mode, Commands from Control op and radio telem

INTERFACE INFO

- 'LEDs' Not used at presently
- Below LEDs: TX ENABLED and AMP ENABLED will display when these conditions are true

USER LIST

Station, connect duration, connect start time (UTC)

ACTIVE PUBLIC STATIONS LIST

IRB Name	{Connected: Station ON Freq} {IP or URL – if I have put it the code} {Software version}
----------	---

2.0 Setting Up the Audio

The quality of the station audio - both receive and transmit - is an important factor on user satisfaction. Audio that is distorted, having long delays, or constantly breaking up will drive users away!!

To transmit quality sound over the Internet requires conversion of the analog audio to a digital representation and then compressing this data for optimal transmission over the Internet. The analog-to-digital conversion (and visa versa) is supported by the sound card in your computer. Usually this generates data rates of 64 kilobits/sec, a rate too fast to be reasonably supported on most internet connections.

Voice-over-IP programs are used to take the digital audio, compressing it for transfer over the Internet, and uncompressing it at the receive end, sending it to the computer audio card to be converted back to the analog format for use by the radio. These programs use very sophisticated and usually proprietary algorithms to achieve high compression ratios to reduce bandwidth utilization. Eg. the VoIP software used by the IRB typically requires only 16kilobits/second or less to provide good quality full duplex audio. Note that this is easily supported by dial up access to the Internet.

Note that for satisfactory HF operations 'full duplex' audio is desirable, i.e. both transmission and reception of audio simultaneously. This allows both monitoring of your transmissions for quality assessment and break in operations. The goal is to make IRB operations as close to direct operations as possible.

Unlike Echolink which does not require extremely low latency audio (i.e. minimal delays), tuning in a HF signal and then waiting for the audio to catch up will not provide satisfactory results. Thus very low latency sound is key to successful HF remote operations, especially if you want to operate contests!!

Three VoIP programs are supported within the IRBHost software. They all share common features although they have different performance. The common features are: low latency, automatically answer and/or call connection, low bit rate to support a dial up connection, and full duplex audio.

2.1 Skype

Skype is the latest and best iteration of freely available VoIP products that can support the IRB. While there are a ever increasing set of VoIP products, most are not suitable for the IRB application, since they do not provide any auto-answer capability. It definitely would be inconvenient to require someone to be at the remote station to answer the audio link!

Skype audio quality is outstanding, but it is only available for the Windows 2000 and Windows XP systems.

The IRBHost2 software talks to the Skype program using an API provided by Skype. This dialogue is used to make sure that Skype, which is a "single user" system, is available to accept calls upon logons. When a station logs onto the IRBHost, any current users of Skype will be automatically disconnected so that the logon user can connect to Skype. Each time you start a new version of the IRBHost program, a Skype generated box will pop-up and you must verify that the IRBHost program can communicate with Skype by checking the top most radio button in the Skype dialogue box.

2.2 IRB Sound

IRB Sound was developed for the remote base project to provide a very low latency VoIP. The voice coding provides two very low latency codecs

- GSM 6.10 used for many cell phones, and
- PCM (toll quality voice)

The GSM coding provides 17kbps for the voice and is useful over a dial up or low quality Internet connection. The PCM coding runs at about 70kpbs and is supported by a broadband Internet connection.

In addition to the very low latency mode, the users can implement one-way buffers from 0.5 to 2.0 seconds to account for poor Internet transmission conditions. Please note that since both sides are similarly buffered the minimum total turn around time is twice the above buffering times

This software provides good quality and is useful for most Windows systems using Windows 98, SE, 2000 and XP.

2.3 Echolink

Documentation coming soon.

2.4 Setting the Sound Levels in the Host Computer

Proper setting of the sound levels is very important for good performance.

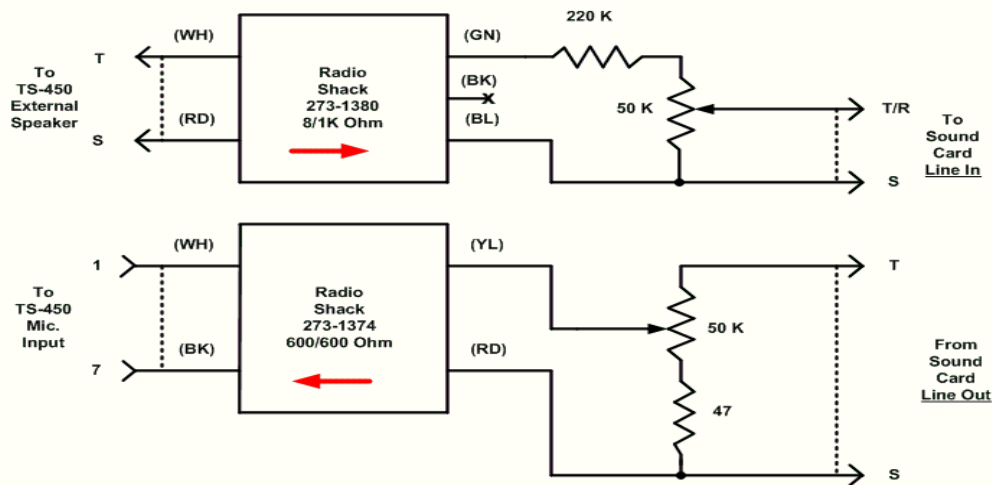
The connections between your radio and computer are as follows:

RX Sound ==>Phone Jack==>[Match Ntwk]====>COMPUTER **LINE IN**

COMPUTER **SPKR OUT**==> [Match Ntwk]==Radio Mic Jack==TX

It is best to take the sound from a source on the radio that is controllable by the volume control. Note that the auxiliary plug available on most radios provides audio out, but at a fixed level. Also if the TS2000 is a good model, the CW monitor audio and TX monitor audio is NOT available at these auxiliary plugs.

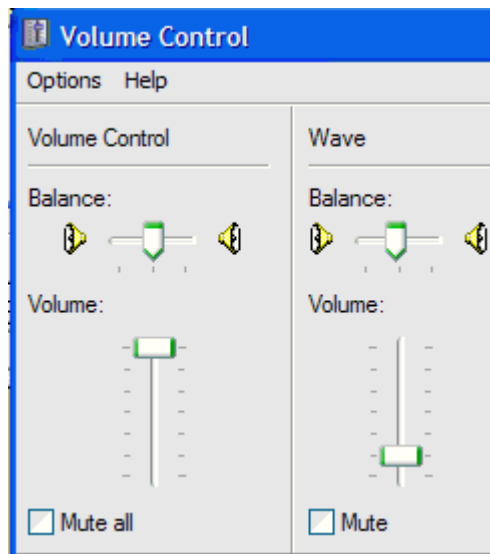
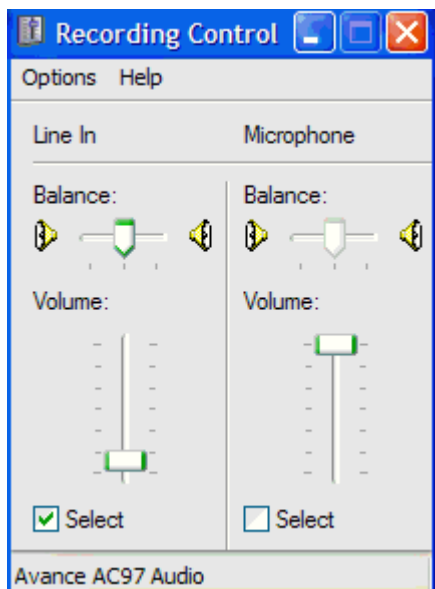
Assuming you take the audio from the phone jack (either in the front or back of the radio) then you need to adjust both the radio output volume and the computer sound card input levels to eliminate creating audio distortion in the VoIP software. Of course you always have the option of using another, non-volume controlled, output of the radio for the audio. In that case you should disable the AF Gain in the setup, by unchecking the check box



I have found that the Computer LINE IN is of sufficient high impedance, that a direct connection, i.e. without any separate impedance matching or level adjustment network, will work in most cases. However, that can not be said for the reverse connection between the Computer SPKR OUT and the Radio Mic input. A separate impedance matching and level adjustment is ALWAYS required. One could use a commercial product, such as a RigBlaster (this allows the connection of your normal station microphone also), or you could construct your own. A simple circuit used by Terry, W7KW for a TS450 connection is shown below.

Setting the Levels:

The **received level** is not that critical and generally can be done simply by listening over a VoIP connection to your station. First set the Sound card LINE IN level at the lower end (approximately 25% up from the bottom) of the scale and then adjust the AF GAIN slider in the Radio setup page until the received audio sounds great.



The **transmitted level** is a bit more critical and should be more accurately adjusted. I have found the best way to do that is to set the IRBHost to the PSK Mode, set the Speaker Out Volume controls (Volume, Wave) as above, and the radio microphone gain at 50%. Bring up the IRBHost monitor display (top menu) and click LOGON to go into the LOCAL mode. Then click on the PSK menu item on the top line of the IRBHost window to bring up the PSK control display. Click TRANSMIT (or course making sure you are on a clear frequency), and adjust the sound card volume (and possibly wave level) controls so that there is **NO** ALC level indication on your radio. Then reduce that gain control by a half step further. You now have both very low IMD (high quality) PSK and non-distorted transmit audio!

3.0 IRBHost Setup

The IRBHost2 software provides a very flexible set of user configurable capabilities that are customized via a text configuration file -- IRBHost.ini. The software DOES NOT write to or change this file, and user comments can be entered into the file, so you can remember how and why you set a particular parameter.

For those wanting to customize the IRBHost configuration, there are several layers of settable items:

- [GENERAL] -- Station level settings
- [RADIO] -- Radio settings both general and by band
- [AMPLIFIER] -- Amplifier settings both general and by band
- [ANTENNA] -- Antenna settings both by antenna and by band
- [USER] -- Control Operator specific settings both general and by band
- [PASSWORDS] -- Control Operator passwords and access class

These support the following features of the IRBHost2 software:

- A set of control operator privilege classes customized to provide various capabilities
 - Frequency limits, amplifier usage, operation session limits, etc., based on control operator class
- A system for assigning and enforcing unique passwords for each control operator
- Control of radio and amplifier setups, e.g. bands, frequency ranges, modes and power levels
- Support for up to 12 antennas configured as up to five antennas per band
- Support for satellite operations, e.g. Echo, ISS, etc.
- Support for Echolink interfacing

But the software is also designed with default values that will allow IMMEDIATE operation of the remote with minimal configuration settings, e.g.

```
[GENERAL]
    CALL=W4MQ
[RADIO]
    INTERFACE=TS2000, COM, 1, 9600
[PASSWORDS]
    W4MQ, MYPW
    W7DXX, HISPW, G
```

3.1 Parameter Definitions

3.1.1 General Settings

3.1.1.1 General Parameters

PARAMETER	DEFINITION	DEFAULT VALUE
CALL	IRB Callsign	Blank
PUBLIC	YES means the station will be published in the list of Active stations. Allows all control ops to know about existence of station and monitor its status via the web browser user interface. {YES/NO}	YES
LATITUDE LONGITUDE	IRB Location. Used to calculate beam headings North Latitude is positive, East Longitude is positive. Units are decimal degrees	0.0 0.0
DEFAULTFREQ	Radio will be reset to this frequency when there is no Control Op. Units are KHz	-1 No default Frequency
PARKAZIMUTH	Rotator will be reset to this azimuth when there is no Control Operator. Units are degrees.	-1 No Park Beam Azimuth
SKYPE	Skype user node name	Blank (Skype interface disabled)
CF1 CF2	Skype users allowed to connect in an automatic conference with IRB connected users	Blank Blank
ECHOLINK	Allow Echolink for monitoring {YES/NO}	NO
IRBSOUND	Allow IRBSound {YES/NO}	YES
MS1, MS2	Scrolling text messages; MS1--Non connected user MS2--Connected user	Blank
CLUSTER	DX Cluster node	
OPENWEB	YES will allow control ops using the Web Browser client interface to tune the radio (i.e. listen only) without logging onto the station, whenever the station is available, i.e. not in use by a logged-on control op. {YES/NO}	NO
CHATOPEN	YES will allow non-logged in users to participate in text chat with the IRB, its control op, and any other station monitoring the IRB.	NO
POWEROFFDELAY	The software will set Radio Power Off 'x' minutes after a user has disconnected. The power will come on when a new user logs onto the remote.	10,000,000 Set value to minute delay before power off will occur

3.1.2.2 General Parameter Example

```

; Example
; This is a comment
[GENERAL]
CALL=W4MQ, LAT=-43.5, LON=-77
DEF=14300, PARK=180
SKYPE=w4mq_remotebase
MS1=Test message...

```

NOTES: These apply to any parameter entry in the configuration file.

- Multiple items allowed on a single line, but must be separated by commas.
 - Spaces are allowed between items.
 - Comments can be included anywhere in the file, but MUST have a semi-colon character ';' as the FIRST character of the line
 - Only the FIRST 3 Chars of a parameter name (i.e. the stuff on the left side of the = sign) are significant. Use as many as you would like for clarity. Note values on the right side of the = sign must be entered exactly as specified for the software to recognize them correctly.
- Please NO double or single quotes within the text

3.1.2 Radio Setup

The radio setup has three parts:

1. Interface between the radio and the computer
2. General setting applicable to all bands of operation
3. Band specific settings

3.1.2.1 Radio Interface Settings

3.1.2.1.1 Direct Radio Interface

The software supports direct control of the Kenwood TS2000, TS480, and TS570 radios. Others can be added upon user requests. Depending upon the radio, the following functions are supported via the computer interface:

- Frequency control including RIT and Split
- Mode (AM, USB, LSB, FM, CW, PSK (via USB))
- RF Power adjustment
- Bandpass Filter settings
- AGC
- Noise reduction processing
- Notch processing
- Rx and Tx audio equalizer setting
- AF Gain
- RF Gain
- Squelch
- Microphone Gain
- CW Tone and Monitor volume
- CW Keying Speed
- PTT
- S-Meter/RF Power meter
- ALC/SWR meter
- Antenna Selection
- Rx Only Antenna
- Amplifier relay control

The interface to the radio is configured via the following statement within the [RADIO] section:

```
INTERFACE= {Radio Name}, COM, {COM Port Number}, {Baud Rate}
```

Where:

Radio Name = {TS2000, TS480, TS570}
COM Port Number = 1 to 15
Baud Rate = Radio COM baud rate setting

E.g. INTERFACE = TS2000, COM, 1, 9600

3.1.2.1.2 Radio Control via DxLab Commander

The DxLab suite of amateur radio applications by AA6YQ supports radio control, station logging, DxCluster operations, Dx database support, and a PSK/RTTY interface (www.qsl.net/dxlab). The IRBHost application interfaces to the DxLab Commander radio control interface to provide a computer interface to a large set of radios as specified at www.qsl.net/civ_commander. While this interface does not support all the functions of the direct radio interface, it does accommodate the basic items that allow remote operations [Note that not all features will be supported by all radios].

- Frequency control including Split
- Mode (AM, USB, LSB, FM, CW)
- PTT
- S-Meter/RF Power meter

The DxLab interface to the radio is configured via the following statement within the [RADIO] section:

```
INTERFACE= {Radio Name}, DXLAB
```

E.g. INTERFACE = FT817, DXLAB

Before using the DxLab Commander interface, the DxLab Commander software must be loaded onto your computer and configured for the selected radio. This is done independently of the IRBHost software. The DxLab Commander for the IRBHost should be downloaded from www.w4mq.com/server.html and installed using the self-installing download provided. It will NOT be installed in the DxLab directory recommended by DxLab, but rather within the W4MQ structure to assure automatic starting by the IRBHost program. This will not affect any other version of DxLab Commander currently installed on your server computer.

Before starting the IRBHost software, the DxLab Commander for IRBHost application should be configured and tested to validate its interface to the radio. Since there is only one set of DxLab Commander configuration settings maintained on your computer, if Commander is already installed on the computer and controlling the radio, then you are finished.

If this is your first installation go to Start->Programs->W4MQ->DxLab Commander to start the application. Then go to the DxLab Commander documentation (http://www.qsl.net/civ_commander/Help/Configuration.htm). Only the "General Tab" and the "Com Tab" need be configured to support the IRBHost interface. Under the "General Tab" only the Radio Panel and PTT Panel need to be configured. Finally try to control your radio using the DxLab Commander. If all is OK then start the IRBHost and you should be controlling the radio remotely.

DxLab has an excellent reflector on Yahoo groups that can address any configuration issues. Dave, AA6YQ, responds quickly to any problems via this reflector.

Note that DxLab Commander will automatically start whenever IRBHost is started.

3.1.2.2 Radio Settings

The software automatically initializes the radio settings as follows:

- Frequency limits

BAND	LIMITS (mHz)	VOICE START (mHz)	DIGITAL MODE LIMITS (mHz)	FM REPEATER OFFSET (mHz)
160m	1.8 – 2.0	1.82	--	--
80m	3.5 – 4.0	3.75	3.58 – 3.62	--
60m	--	--	--	--
40m	7.0 – 7.3	7.15	7.03 – 7.1	--
30m	10.1 – 10.15	--	10.11 – 10.15	--
20m	14.0 – 14.35	14.15	14.065 – 14.1	--
17m	18.068 – 18.168	18.11	--	--
15m	21.0 – 21.45	21.2	21.065 – 21.1	--
12m	24.89 – 24.99	24.93	--	--

10m	28.0 – 29.7	28.3	28.065 – 28.1	0.1
6m	50.0 – 54.0	50.1	--	1.0
2m	144 – 148	144.1	--	0.6
70cm	420 - 450	420	--	5.0
23cm	1200 - 1300	1200	--	25.0

Since the digital modes require use of the USB mode outside of these limits, special limits are set for the digital modes.

- Radio maximum RF power allowed for each band.

Digital Mode Parameters: The use of SSB to support the digital modes, e.g. PSK, requires some specific settings that are applied to all bands. These are:

PSKMAXPOWER = {0 - radio limits} Default=30
MICGAINFORPSK = {4 to 15} Default=9

FM Parameters: In addition, the FM power used to access repeaters and FM satellites (not used in non-repeater situations) can be set globally.

RPTMAXPOWER = {0 - radio limits} Default=20
SATMAXPOWER = {0 – radio limits} Default=10

Radio Volume Control: While some users prefer using the fixed low level audio provided at the radio ACC plug so they may monitor the radio via the speaker. However, I recommend taking the radio from the phone jacks in the back of the radio, since in the Kenwood radios neither the CW monitor nor the TX monitor signals are available from the ACC. If you insist on using the ACC, then I have provided a configuration parameter to allow disabling the user from setting the volume control. Thus you may listen on the radio speakers without a control op changing your sound level.

NOVOLUME = {YES/NO} Default=NO, i.e. volume control is allowed

3.1.2.3 Band Specific Settings

For each band, the following can be set. Note that any parameter NOT set will use the default value, so it is only required to set those that should be different from the default.

BAND = {0,160,80,60,40,30,20,17,15,12,10,6,2,70,23}
TX = {NO/OFF} Default = YES
NO = No transmit for this band
OFF = No Transmit or Receive for this band
PWR = {Watts} Max transmit power. Default is radio max; usually 100W
FLO = Band Start in kHz. Defaults in Section 3.1.2.2
FHI = Band End in kHz. Defaults in Section 3.1.2.2
FSSB = Voice band Start in kHz. Defaults in Section 3.1.2.2
FLPSK = Band Start for Digital modes in kHz. Defaults in Section 3.1.2.2
FHPSK = Band End for Digital modes in kHz. Defaults in Section 3.1.2.2
FMOFFSET = FM Repeater Offset in kHz. Defaults in Section 3.1.2.2

3.1.2.4 Example Radio Settings

```
; W4MQ
;
[RADIO]
;
INTERFACE = TS2000, COM, 1, 9600
;
; Ham bands only receive
BAND=0, TX=OFF
; Reduced power, no 160M OR 60m TX, no 23cm band;
```

BAND=160, TX=NO
BAND=80, PWR=50
BAND=60, TX=NO
BAND=40, PWR=50
BAND=30, PWR=50
BAND=20, PWR=50
BAND=17, PWR=50
BAND=15, PWR=50
BAND=12, PWR=50
BAND=10, PWR=50
BAND=6, PWR=20
BAND=2, PWR=20
BAND=70, PWR=20
BAND=23, TX=OFF

3.1.3 Amplifier Setup

The amplifier setup has three parts:

1. Interface between the amplifier and the computer
2. General setting applicable to all bands of operation
3. Band specific settings

Note that if you are using an Alpha87 amplifier, make sure that HNDSHK is set to OFF. This is usually the default factory setting. But if you should check this setting anyway.

3.1.3.1 Amplifier Interface Settings

INTERFACE= {Amplifier Name}, COM, {COM Port Number}, {Baud Rate}

Where:

Amplifier Name = {ALPHA87, AMERITRON, SGC, etc}

COM Port Number = 1 to 15 (for ALPHA87 only)

Baud Rate = Amplifier COM baud rate setting (for ALPHA87 only)

E.g. INTERFACE = ALPHA87, COM, 4, 4800

INTERFACE = AL1200 or INTERFACE = PW1

Note: If you are using the relay capability to control the amplifier AC power or you are using a PW-1, then you must also specify the "relay board" interface. This can be either the ADR2200 serial interface board or a parallel interface relay board. This need only be done once, either in this section or in the ANTENNA section, if the relays are to be used for antenna switching also. Specification in either section (or both for convenience of definition is acceptable, assuming it is the same INTERFACE statement). The sample statement is for the serial relay board is:

INTERFACE= ADR2200, COM, {COM Port Number}, {Baud Rate}

Where:

COM Port Number = 1 to 15

Baud Rate = Switch COM baud rate setting

E.g. INTERFACE=ADR2200, COM, 8, 9600

Or if a Parallel relay board is used:

INTERFACE= PIO, ADDRESS

Where: ADDRESS=Hexadecimal address of the LPT port selected, e.g. 378 is the usual for LPT1

E.g. INTERFACE=PIO, 378

3.1.3.2 General Amplifier Settings

The software automatically initializes the amplifier band limit settings. **The amplifier use is NOT enabled by the default initialization process, but must be enabled via this configuration file, both generally and by band.**

ALLOWED = {YES/NO} Default is NO

DELAYACOFF = {Minutes} Default is 0

RELAY = {1-8} Default=0 Relay for AC On/Off (Not used for ALPHA87)

PW1RELAY = {1-8} Relay required to toggle PW-1 power switch to support automated operation

Note if you use a PW-1, then you must define RELAY and PW1RELAY. Email Stan for details for the modification to the PW-1 control box to allow automatic remote operations

3.1.3.3 Band Specific Settings

For each band, the following can be set. Note that any parameter NOT set will use the default value, so it is only required to set those that should be different from the default.

BAND	=	{0,160,80,60,40,30,20,17,15,12,10,6,2,70,23};	Note that Alpha87 only supports 160m thru 10m
ENABLED	=	{YES/NO}	Default = NO
MAXDRIVE	=	{Watts}	Max exciter power. Default is 50W
FLO	=	Amplifier Start in kHz.	Defaults in Section 3.1.2.2
FHI	=	Amplifier End in kHz.	Defaults in Section 3.1.2.2
KEYDOWN	=	{YES/NO}	Allow AM, FM, PSK, with amp. Default is NO

3.1.3.4 Example Amplifier Settings

[AMPLIFIER]

INTERFACE = ALPHA87, COM, 4, 4800

ALLOWED=YES, DELAY=60

BAND=80, ENABLED=YES, MAXDRIVE=30, FLO=3750, FHI=4000, KEYDOWN=YES

BAND=40, ENABLED=YES, MAXDRIVE=30, KEYDOWN=YES

[AMPLIFIER]

INTERFACE=AL1200

(SPECIFIES AMPLIFIER)

INTERFACE=ADR2200, COM, 10, 9600

(USED TO SPECIFY RELAY BOARD)

ALLOWED=YES, DELAY=10, RELAY=3

BAND=80, ENABLED=YES, MAXDRIVE=30, FLO=3800, FHI=4000, KEYDOWN=NO

3.1.4 Antenna Setup

The antenna setup has four parts:

1. Interface between the antenna switch and the computer
2. Interface between the rotator and the computer
2. Antenna definitions
3. Band specific use of up to five antennas per band

3.1.4.1 Antenna Interface Settings

Note: If you are using the relay capability to control an external antenna switch, then you must also specify the “relay board” interface. This can be either the ADR2200 serial interface board or a parallel interface relay board. This need only be done once, either in this section or in the AMPLIFIER section, if the relays are to be used for amplifier power control switching also. Specification in either section (or both for convenience of definition is acceptable, assuming it is the same INTERFACE statement). The sample statement is for the serial relay board is:

```
INTERFACE= ADR2200, COM, {COM Port Number}, {Baud Rate}
```

Where:

COM Port Number = 1 to 15

Baud Rate = Switch COM baud rate setting

E.g. INTERFACE=ADR2200, COM, 8, 9600

Or if a Parallel relay board is used:

```
INTERFACE= PIO, ADDRESS
```

Where: ADDRESS=Hexadecimal address of the LPT port selected, e.g. 378 is the usual for LPT1

E.g. INTERFACE=PIO, 378

3.1.4.2 Rotator Interface Settings

```
INTERFACE=ARS, ARS          for the Antenna Rotator System rotator interface
```

```
INTERFACE=HYGAIN, COM, {COM Port Number}, {Baud Rate}  
for an HyGain or Idiom Press Interface
```

3.1.4.3 Antenna Definitions

Up to 12 individual antennas can be defined. Each antenna has the following parameters:

ANTNUM	=	{1-12}	
DESCRIPT	=	{text description}	Default is blank
NAME	=	{<=6 chars used for display}	Default is blank
CONNECT	=	{Radio antenna connector 1,2}	Default is 0
SWITCH	=	{1-16} Switch relay port	Default is 0
ROTATOR	=	{1} for Hygain or {1-4} for ARS	Default=0
OFFSET	=	{-180 to 180} Azimuth offset for this antenna	Default=0

3.1.4.4 Band Specific Settings

For each band, the following can be set. Note that any parameter NOT set will use the default value, so it is only required to set those that should be different from the default.

BAND = {0,160,80,60,40,30,20,17,15,12,10,6,2,70,23}
NUM = {1 to 5}
ANT = {1 to 12}
TUNER = {0 to 2}
 0= NO antenna tuner
 1= Tuner only w/o amp
 2= Tuner all the time
FLO = Antenna Start in kHz. Defaults in Section 3.1.2.2
FHI = Antenna End in kHz. Defaults in Section 3.1.2.2
AMP = Antenna is Enabled/Disabled for use by the amplifier on this band. Default = Enabled
 {NO} → disables amplifier for this antenna

3.1.4.5 Example Antenna Settings

```
; VK3UR
;
[ANTENNA]
;
INTERFACE = ADR2200,COM,2,9600
INTERFACE = ARS, ARS
;
ANT=1, DES=TH3MK4, NAME=TH3MK4, CON=1, SWI=1, ROT=1
ANT=2, DES=WARC Dipole, NAME=WRC, CON=1, SWI=2, ROT=1
ANT=3, DES=80 - 10 Dipole, NAME=DIPOLE, CON=1, SWI=3
ANT=4, DES=160m Dipole, NAME=160, CON=1, SWI=4
ANT=5, DES=60m Dipole, NAME=60, CON=1, SWI=5
ANT=6, DES=6m Vertical, NAME=6VERT, CON=2
ANT=7, DES=2m - 23cm Vertical, NAME=VERT, CON=1, SWI=6
ANT=8, DES=2m Yagi, NAME=2YAGI, CON=1, SWI=7, ROT=1
ANT=9, DES=70cm Yagi, NAME=70YAGI, CON=1, SWI=8, ROT=1
ANT=10,DES=23cm Yagi, NAME=23YAGI, CON=1, SWI=5, ROT=1
;
BAND=0, NUM=1, ANT=3, TUNER=0
BAND=160, NUM=1, ANT=3, TUNER=2
BAND=80, NUM=1, ANT=3, TUNER=2
BAND=60, NUM=1, ANT=5, TUNER=0
BAND=40, NUM=1, ANT=3, TUNER=2
BAND=30, NUM=1, ANT=2, TUNER=2
BAND=20, NUM=1, ANT=1, TUNER=2
BAND=20, NUM=2, ANT=3, TUNER=2
BAND=17, NUM=1, ANT=2, TUNER=2
BAND=15, NUM=1, ANT=1, TUNER=2
BAND=15, NUM=2, ANT=3, TUNER=2
BAND=12, NUM=1, ANT=2, TUNER=2
BAND=10, NUM=1, ANT=1, TUNER=2
BAND=10, NUM=2, ANT=3, TUNER=2
BAND=6, NUM=1, ANT=6, TUNER=0
BAND=2, NUM=1, ANT=7, TUNER=0
BAND=2, NUM=2, ANT=8, TUNER=0
BAND=70, NUM=1, ANT=7, TUNER=0, FLO=433000
BAND=70, NUM=2, ANT=9, TUNER=0, FLO=420000, FHI=433000
BAND=23, NUM=1, ANT=7, TUNER=0
BAND=23, NUM=2, ANT=10,TUNER=0
```

3.1.5 Password Settings

At a minimum, a password must be set up for a control operator to log into the remote station.

For the stations currently using the Remoteserver software, the 'passwords.csv' file can continued to be used and edited via the PW Maint utility or via Microsoft Excel. IRBHost, however, also provides a new, simpler password schema for those stations with only a small number of users

The new password data can be entered directly into the IRBHost setup configuration file using the format:

```
[PASSWORDS]
CALLSIGN, PASSWORD
CALLSIGN, PASSWORD, CONTROL OP CLASS
```

The CONTROL OP CLASS is a single character ALPHABETIC designator that is used to assign specific attributes to this type of Control Operator. There are seven pre-defined control ops types with the capability for the station manager to define up to 20 additional types.

- Receive only: "R" and "X"
- U. S. License Classes: "T" = Technician, "G" = General, and "E" = Extra
- Power User : "P"
- Administrator: "M"

If the CONTROL OP CLASS field is left blank, then that user is assigned the "M" or Administrator class.

The default session times assigned to each category are as follows:

- GUEST -- 5 minutes
- Administrator – Unlimited, actually 9999
- Power User -- 120 minutes
- All others -- 60 minutes

Password Management is performed either via a text editor (for simple password files) or via the Password Maintenance Utility accessible via the Password Menu. Since the separate password file is named "passwords.csv", it will default to the Excel *.csv file category and can also be managed using the Excel program

Unfortunately the password transition between the current and new host software has presented a major challenge (or headache). The goal of simplification has clashed with retaining the current password files in the operating IRBs using the old server software. I have addressed this by translating the old vs new format within the new server software, so the same old password file will work with either server software. Unfortunately that requires some rules to be followed in the existing password files for the automatic conversion to be successful. These are as follows: Note that the limits below are also settable within the configuration file. If you desire different level than the defaults please contact W4MQ for information.

- All entries with a level <4 were translated to "R" read only
- All other entries are set to the general user defaults except as noted below
- All entries with levels >=6 were set to "P" or Power Users.
- All entries with level=9 were set to Administrator Users
- All other designators in your password file will be passed thru and set to the general user defaults

The IRBHost software will first search the "passwords.csv" file (if one is present) and then the IRBHost.ini file for the logon/password information.

3.1.6 Control Operator Setup

3.1.6.1 Overview of the Control Operator Concept

The Control Operator setup has two parts:

1. General setting applicable to all bands of operation
2. Band specific settings

3.1.6.2 General Control Operator Settings

The Control Operator frequency limits and transmit privileges are automatically initialized by the software for the US Amateur band limits and the allowed transmit access based on the [RADIO] settings. The control operator is initialized with NO amplifier access. This must be done on within this section.

The general control operator settable parameters are:

TIMEOFSESSION	=	{Minutes}	Defaults depend on Control OP class
MAMPALLOWED	=	{YES/NO}	Default is NO
MTXALLOWED	=	{YES/NO}	Default is NO (RX Only), YES all others
CMDTIMER	=	{Minutes}	Default=20
GENUSERTIMER	=	{Minutes}	Default=60
TPW <i>(PWRUSERTIMER)</i>	=	{Minutes}	Default=120
GUESTTIMER	=	{Minutes}	Default=5
ROTATORENABLED	=	{NO, YES}	Default=YES

3.1.6.3 Band Specific Settings

For each band, the following can be set. Note that any parameter NOT set will use the default value, so it is only required to set those that should be different from the default.

BAND	=	{0,160,80,60,40,30,20,17,15,12,10,6,2,70,23}
AMPALLOW	=	{YES/NO} Default = MAMPALLOWED above
FLO	=	Band Start in kHz. Defaults in Section 3.1.2.2
FHI	=	Band End in kHz. Defaults in Section 3.1.2.2
FSSB	=	Voice band Start in kHz. Defaults in Section 3.1.2.2
FLPSK	=	Band Start for Digital modes in kHz. Defaults in Section 3.1.2.2
FHPSK	=	Band End for Digital modes in kHz. Defaults in Section 3.1.2.2
ROT	=	ROTATORENABLED {NO, YES} Default=YES
TIL	=	TX Inhibit Segment Start in kHz. Default =0, i.e. No Inhibit
TIH	=	TX Inhibit Segment End in kHz.

3.1.6.4 Example Control Operator Settings

; VK3UR Example

; Note non-specified [USER] region sets parameters for ALL control operators

[USER]
 CMD=20, GEN=60, TPW=120

; Class U - VK Unrestricted

[USER=U]
BAND=80, FLO=3500, FHI=3800, FSSBSTART=3600 BAND=40, FLO=7000, FHI=7300, FSSBSTART=7075
BAND=30, FLO=10100, FHI=10150, FSSBSTART=10115 BAND=10, FLO=28000, FHI=29700, SSBSTART=28500
BAND=70, FLO=420000, FHI=450000, FSSBSTART=432100
BAND=23, FLO=1200000, FHI=1300000, FSSBSTART=1296100

; Class C - CEPT

[USER=C]
BAND=160, FLO=1810, FHI=1875, FSSBSTART=1820
BAND=80, FLO=3500, FHI=3800, FSSBSTART=3600 BAND=40, FLO=7000, FHI=7100, FSSBSTART=7075
BAND=2, FLO=144000, FHI=146000, FSSBSTART=144100
BAND=70, FLO=430000, FHI=440000, FSSBSTART=432100

; W7DXX Example

; Changing the default timers for the General Users and Guests

[USER]
 GENUSER=30, GUEST=0

; Defining two user classes with 120min sessions

; One with amplifier access and one without

[USER=P]
 MAMPALLOWED=YES, TIME=120

[USER=Q]
 TIME=120

; Example of limiting a GUEST user to ham band only and NO rotator privileges

; Assign the category 'X' to the GUEST logon in the password file

[USER=X]
; Note that Band=0 is the "non-ham" band, TX=OFF → no Rx or Tx allowed in this band
 BAND=0, TX=OFF
 ROT=NO