

MOAS II

Client

Intelligent Antenna Switch

Version 1.0.13

Yankee Clipper Contest Club

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Preface

MOAS stands for “Master of Antenna Switching”, or if you prefer, “Mother of All Switches”. The MOAS II is the second generation of this basic design and is more powerful and easier to construct than the original.

This document describes a Windows client which can be used with the MOAS II server. The server is described in the MOAS II Manual.

As you read this manual please keep in mind the following three things:

- 1 The interface is highly configurable. You are encouraged to change the fonts, buttons, and what is displayed.
- 2 The defaults are boring. They work but you can find better ways to set things up.
- 3 I have already implemented several ideas suggested by users. If there is a feature you would like ask me and I’ll try to implement it.

1. Overview

The MOAS II consists of three parts – the intelligent switch, the server program, and the clients. The MOAS II client is a Windows client.

1.1. Capabilities

The MOAS II client provides capabilities for users of Windows.

Some capabilities are only available if the client is running on the same PC as the logging program. Most capabilities are available from any PC which can communicate with the server using TCP/IP.

1.1.1. Logging Program Interface

The client can obtain frequency information, active station, and antenna direction information from DXLog.net, N1MM Logger+, Win-Test, and WriteLog. It can obtain logger messages (F keys) from N1MM Logger+. It can also obtain frequency information from OmniRig.

1.1.2. Antenna Display and Selection

The client provides several ways to display and select antennas.

1.1.3. Rotator Direction Display and Selection

The client can display the direction of a rotator numerically or on a compass and can change the direction of a rotator.

1.1.4. Configurable

The number and types of displays, the sizes and colors, and what is displayed may be configured according to the preferences of the operator.

1.1.5. Internationalization

The client is not internationalized. However the display texts can be set to the Unicode strings preferred by the user. In practice this means the operation but not the configuration can be set up in whatever language the operator prefers.

1.1.6. Scripting

The client can be controlled by a scripting program which sends it messages.

2. Antenna Display and Switching

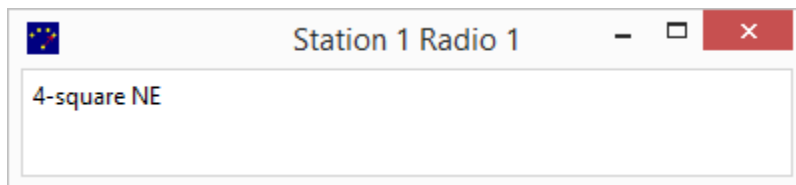
The MOAS client has two ways to display and select antennas. They can be displayed as a list or as a grid of buttons. The grid of buttons offers more powerful selection but the list is a simpler way of looking at what is selected.

2.1. Antenna Display

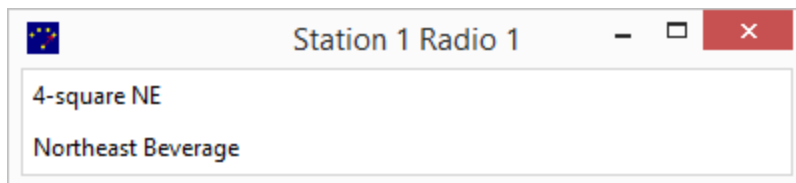
The Antenna Display windows show a list of antennas. A window can show the antennas for one radio or for several.

A list may only have one antenna or it may have several. It may show the receive antenna when it is different than the transmit antenna.

This is the default antenna display, which is what is shown if an antenna display is configured but none of the configuration options are changed from the defaults:



And this is the same display when the transmit and receive antennas are different:



Since this display only shows the selected antenna it cannot be used to choose a different antenna.

If the windows shows more than one antenna antennas it will display other antennas which are configured for the radio and it can optionally be used to select them. Here is an example which displays five antennas, transmit only, with the selected antenna shown in bold type:

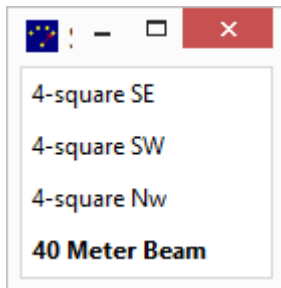


It is possible to place the selected antenna in the center of the list. If this is done the list of antennas is treated like a loop and is rotated until the selected antenna is centered:



The windows can also be resized. They often must be resized because when they are originally created they may be too narrow to show the title.

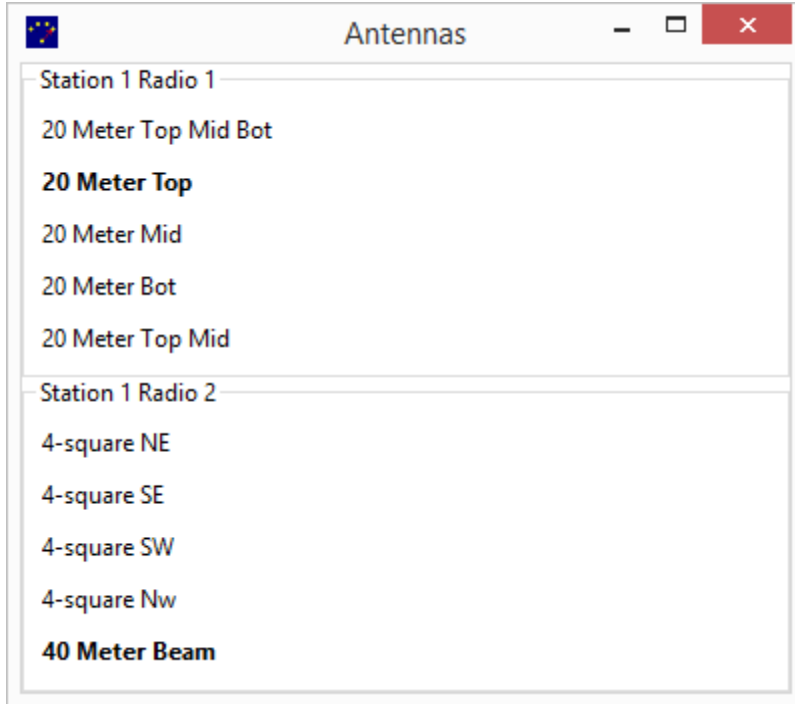
The size and location of the window is remembered so if you stop the client the next time it runs it will put all of the windows where they were previously. The exception is if you reconfigure a window – then it reverts to the default size and position.



In this case the window is configured to show a maximum of four antennas. There are five antennas available on this band so one is not shown. The list will be shifted if necessary so the selected antenna will be shown.

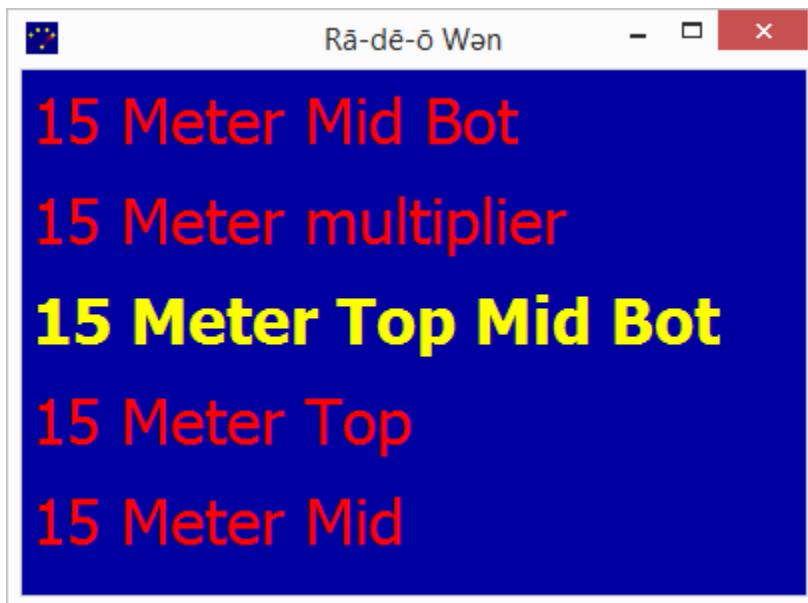
If a radio has more antennas than will fit in the list then the button grid is probably a better choice for selecting antennas.

One window can show antennas for more than one radio.



The names of the sections are configurable. They were set to make it obvious which radio they are showing.

Fonts and colors can also be changed:



The Antenna Display can be run on any PC that can connect to the server.

Antenna Selector

The Antenna Selector shows a grid of buttons which can be clicked to select antennas. Some buttons may also perform functions. The antennas and functions and their layout is controlled by the server.

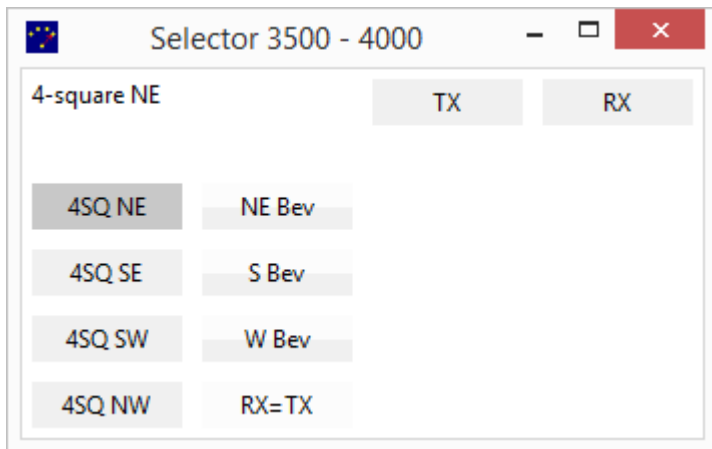
A window shows the antenna choices for one radio. That can be for a specific station and radio or if the window is running on the same PC as the logging program it can be the radio that has focus in the logging program.

An antenna can be in one of three states – it can be unavailable, available, or selected. And this can be different for transmit and receive. An antenna is unavailable if it cannot be selected such as when another station is using it. It is available if it could be selected.

The top half of a button shows the transmit state and the bottom shows the receive state.

Available and unavailable are represented by different colors. Selected may be represented by a different color or by a stripe on an available button. The colors, font, button shape, stripe color, and stripe width are configurable.

This is the default antenna selector which is what is shown if an antenna selector is configured but none of the configuration options are changed from the defaults:

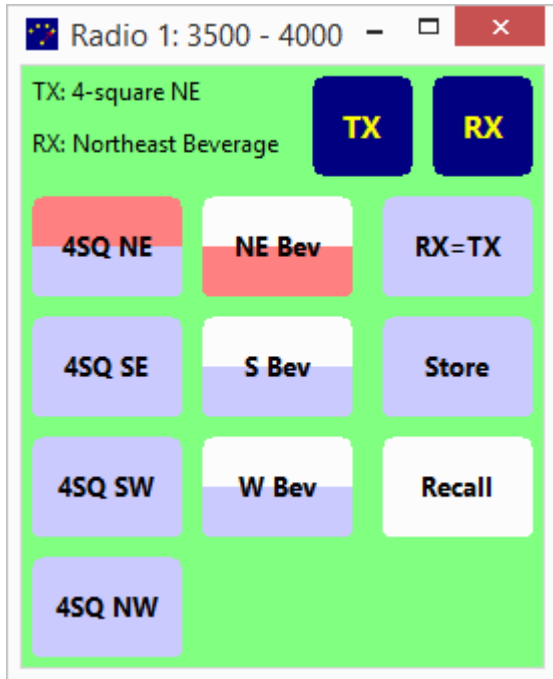


The selected antenna is displayed in the upper left corner. There are TX and RX buttons which are used to change only the transmit or receive antennas. These items can be configured as desired.

The top half of the three beverage buttons is the color which shows that an antenna is unavailable. This is because these are receive-only antennas which cannot be selected for transmit.

The RX=TX button is for a function which sets the receive antenna to be the same as the transmit antenna. It is unavailable because transmit and receive are already using the same antenna.

This is a more colorful selector:

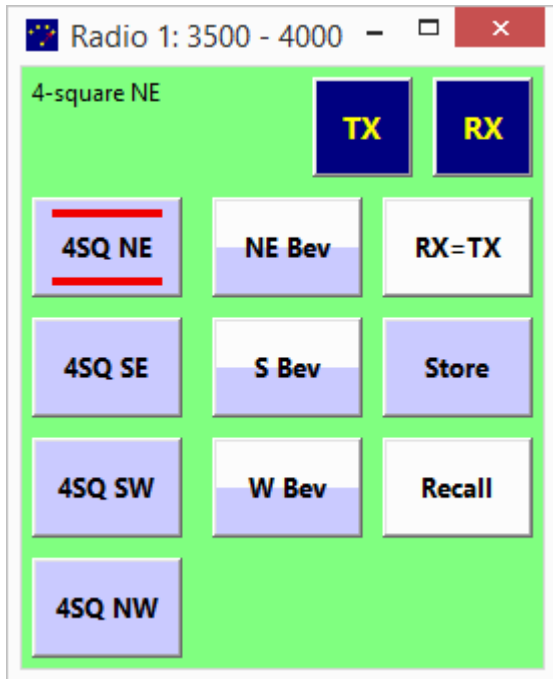


The selected antennas are the 4-square NE for transmit and the NE Beverage for receive. RX=TX is available.

The Store and Recall buttons are a pair of functions that work together. Store remembers the current antenna and Recall switches to the last saved antenna if possible. The Store function is available. The Recall function is not because no antenna has been stored.

There is a slightly larger gap between the second and third columns and the first two, which in this case separates the antenna selection buttons from the functions. This is optional and configurable.

There are several different types of buttons available. And the selected antenna can be shown by either a color change or by a stripe:



This example shows 3D buttons for the antenna and the TX and RX buttons.

A grid of buttons is good for controlling an antenna such as a stack. A stack of three yagis has seven possible combinations, which would be a lot of buttons. However it can be set up as an additive antenna.

This shows such a stack. The individual antennas can be selected and deselected. They are additive buttons because alternately pressing them will add the antenna to the stack or remove it.

There is an extra button which will select the entire stack. It is an exclusive button. Pressing it will not remove anything from the stack. This button is not necessary because all of the antennas can be selected by pressing the additive buttons. But it is convenient because it saves keypresses.

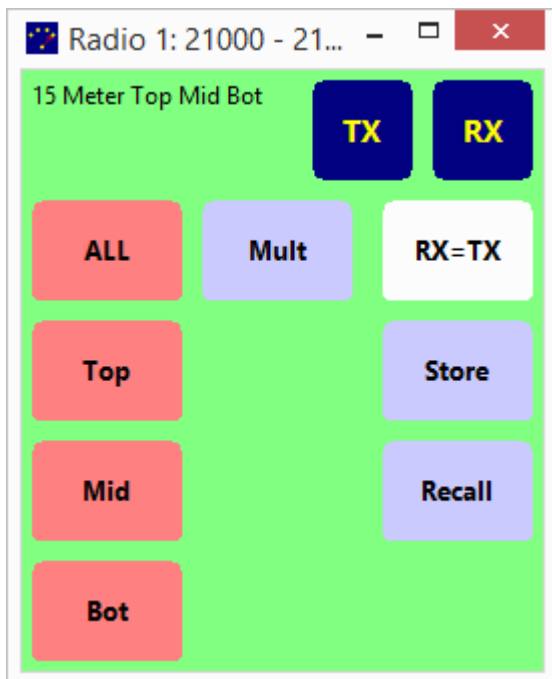


In this case just the top antenna is selected.

Clicking on the Mid button will select that antenna also:

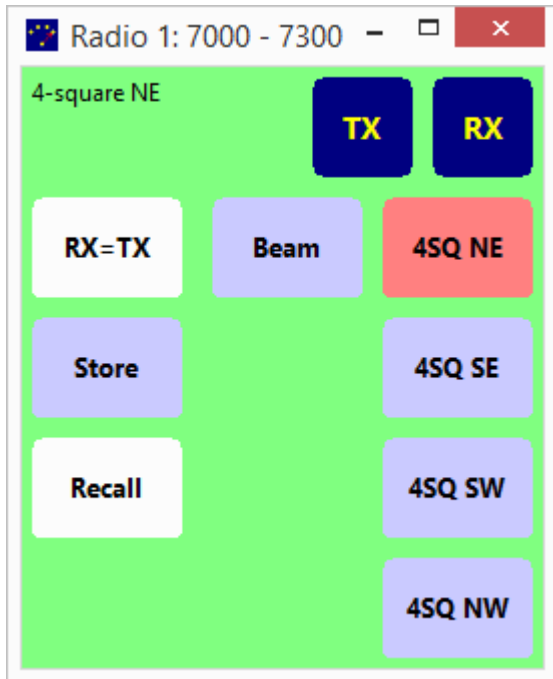


Pressing the ALL button or pressing the Bot button will cause all three antennas to be selected:



If a single antenna from the stack is desired the other two could be clicked to deselect them. Alternatively the window can be configured so that double-clicking or right-clicking a button will select that antenna exclusively and will deselect all others. On a touch screen a touch and hold can also do this.

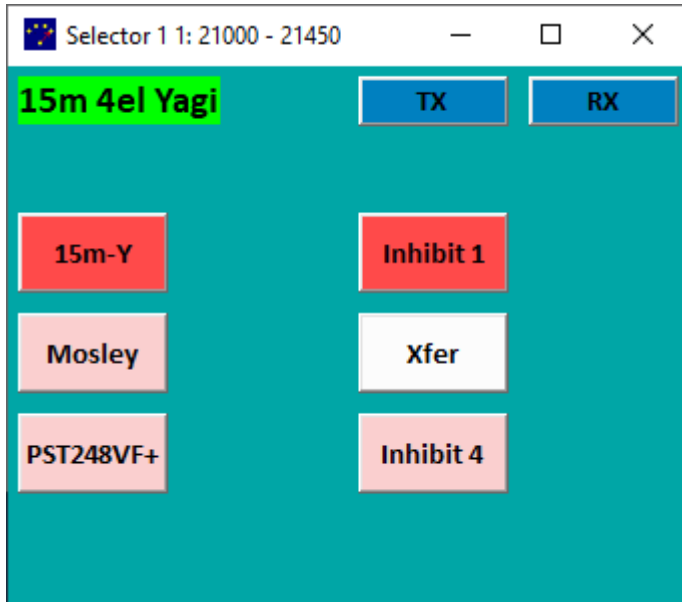
The button layout is controlled by the server. However the client can rotate it or flip it if desired. Here is the previous layout but flipped left to right:



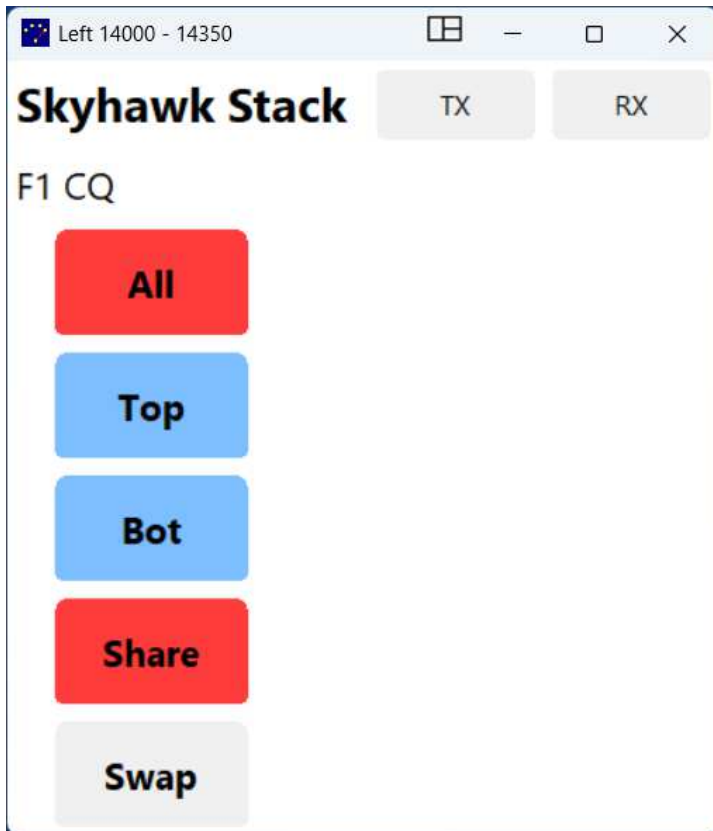
The Antenna Selector can be run on any PC that can connect to the server. The only restriction is that if it is not on the same PC as the logging program it cannot display the antennas for the radio with logging focus.

The Antenna Selector can show the transmit / receive status of the radio if the server is configured to do this. It will also indicate that the radio is inhibited and cannot transmit and that the server is not able to communicate with the switch. This is done by changing the color of the window background or of the background behind the antenna name.

This is an example of the antenna name color being changed. The colors are configurable:



The antenna selector can display the F-key messages from N1MM Logger Plus:

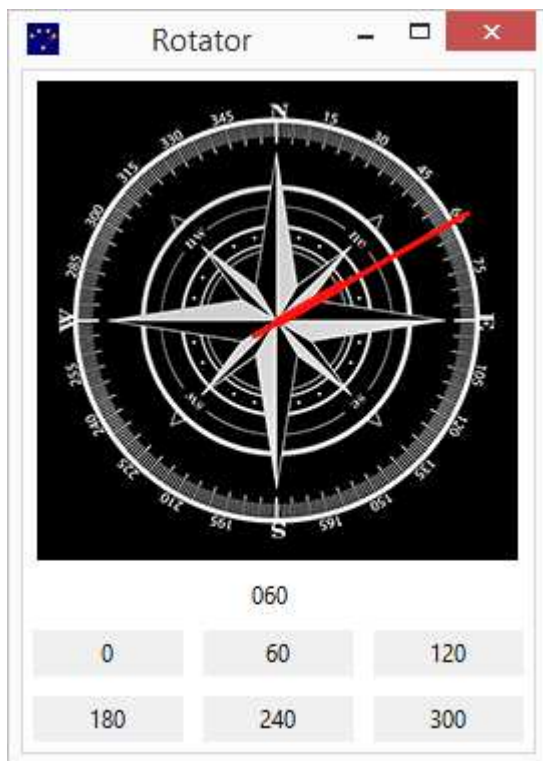


3. Rotator Direction

The MOAS Client has several ways to display and control the direction of rotators and antennas. The direction can be displayed as a number or a pointer on a compass. It can be set by clicking on the compass, by typing a number, or by pressing a button.

There is one other way to change the direction of an antenna. If the logging program which is interfaced to the MOAS Client commands an antenna direction change the antenna or antennas that have been selected for the radio with focus will be rotated to that direction.

This is the Rotator Direction display, which is what is shown if an antenna display is configured but none of the configuration options are changed from the defaults:



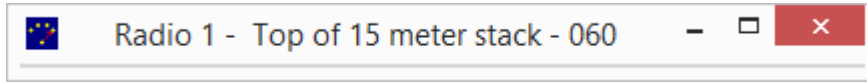
It shows direction both on a compass and numerically. Direction can be changed by clicking on the compass or by clicking on one of the buttons below.

The size of the compass can be changed. It can also be replaced by an image such as a map.

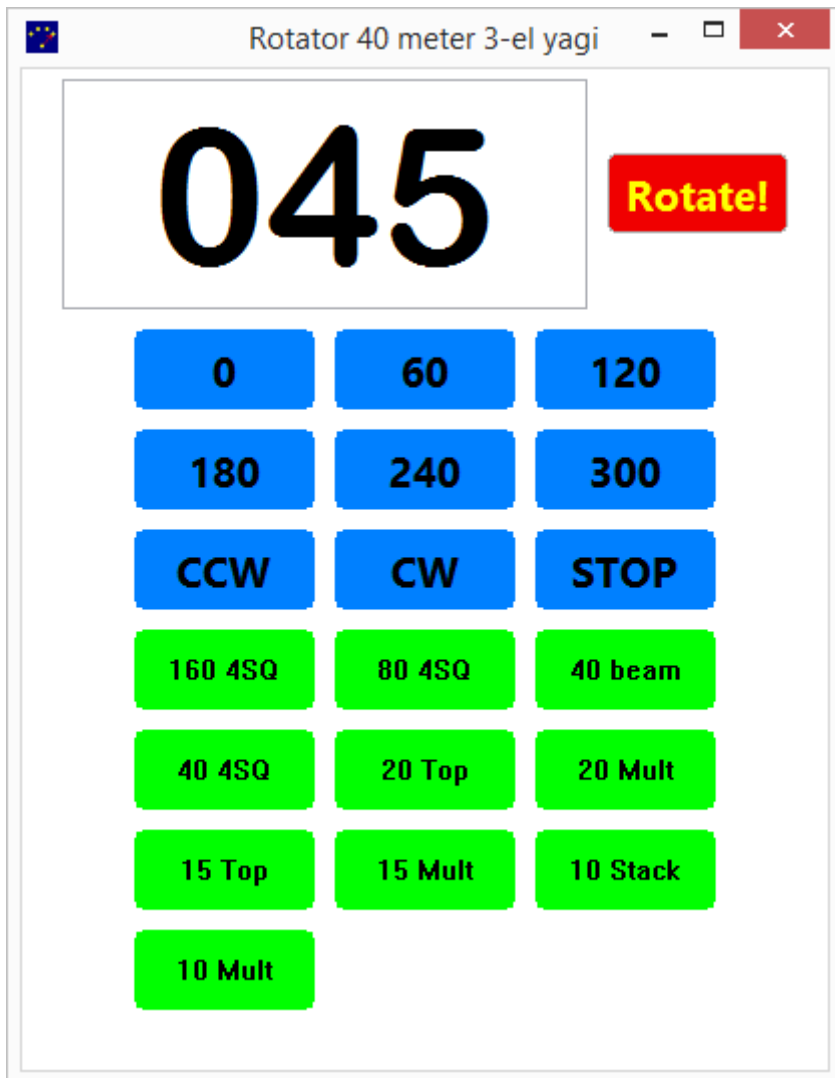
The digital number size, font, and color can be changed. It can also be set to accept input.

The button size, color, style, and text font can all be changed.

The rotator name and direction can be added to the title. This display window just has the title. It cannot change the direction but it shows the information in a small space.



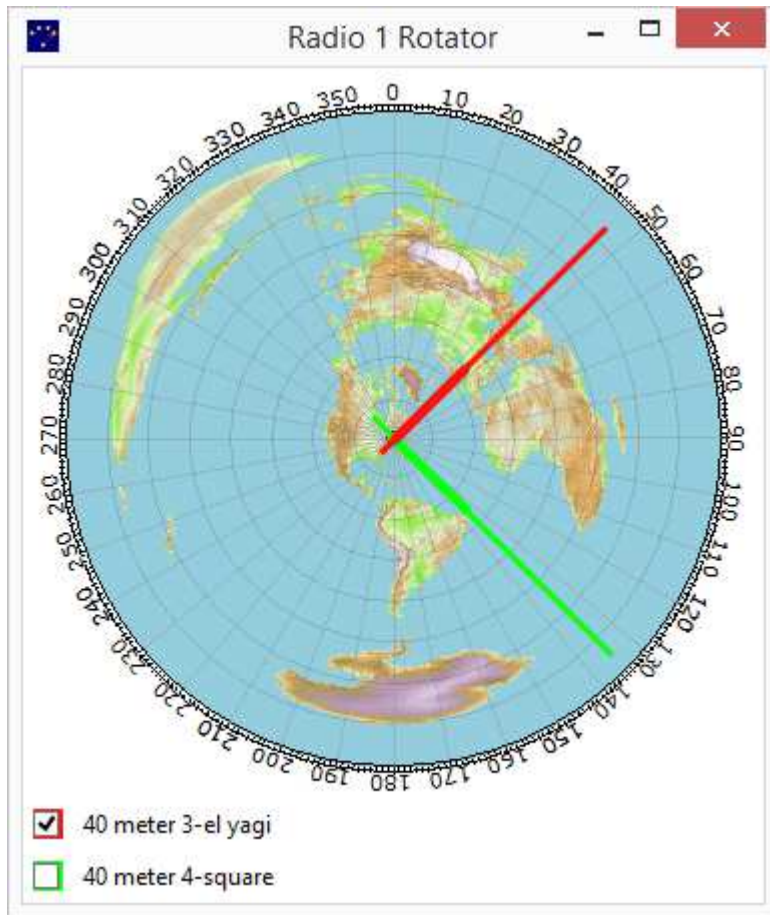
A window can be configured with buttons to select which rotator to turn or display. This window can display or turn any rotator in the station:



Typing a number into the box and pressing the Rotate! button or pressing the Enter key will cause the rotator to turn to the specified direction.

The text in the Rotate! button is configurable. The CCW, CW, and STOP buttons are optional and their text is also configurable. They are only supported if the rotator supports a stop command.

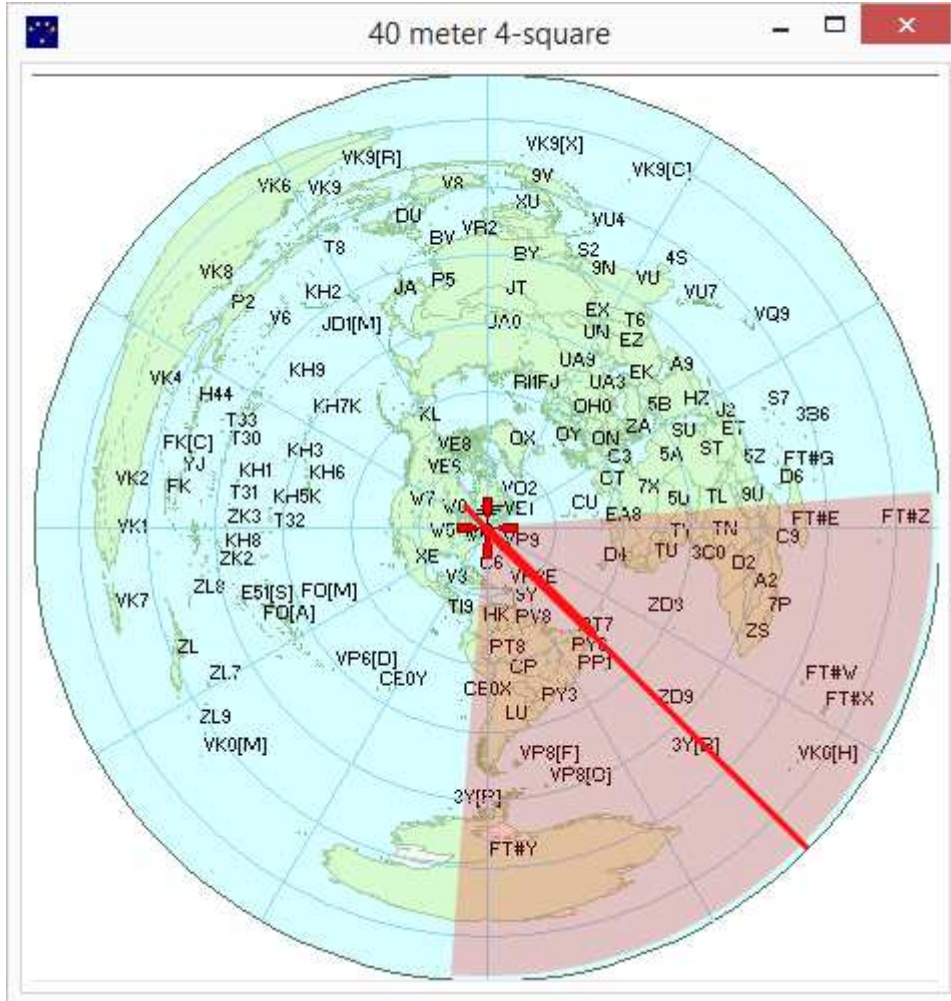
A compass can show more than one rotator:



Clicking on the compass will rotate the yagi but will not change the 4-square because the yagi's box is checked and the 4-square's is not.

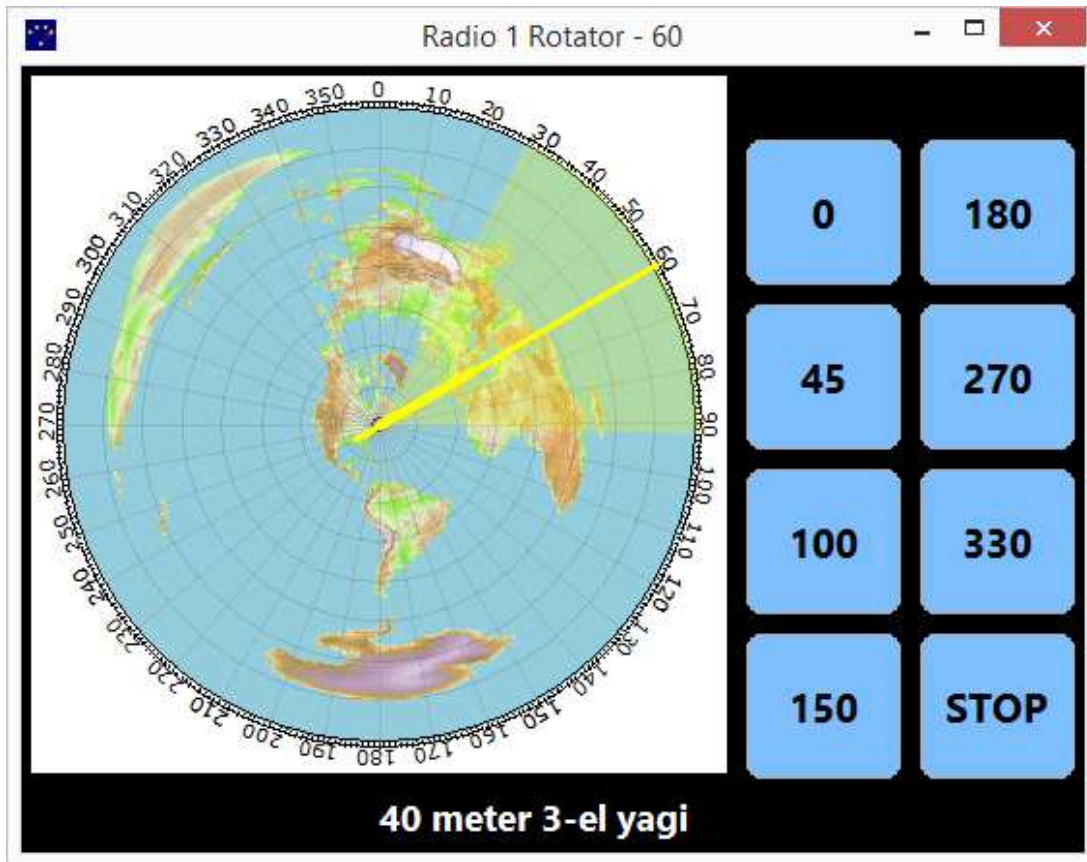
If a rotator is being shown because it turns an antenna then additional information is known and can be displayed. The antenna beamwidth, number of lobes, and offset from the rotator can all be shown.

This window shows the 3 dB beamwidth of the 4-square:



Since the 4-square is electrically rotatable the direction can be changed by turning the rotator in a Rotator Direction window or by selecting one of the four antennas in an Antenna Display or Antenna Selector window.

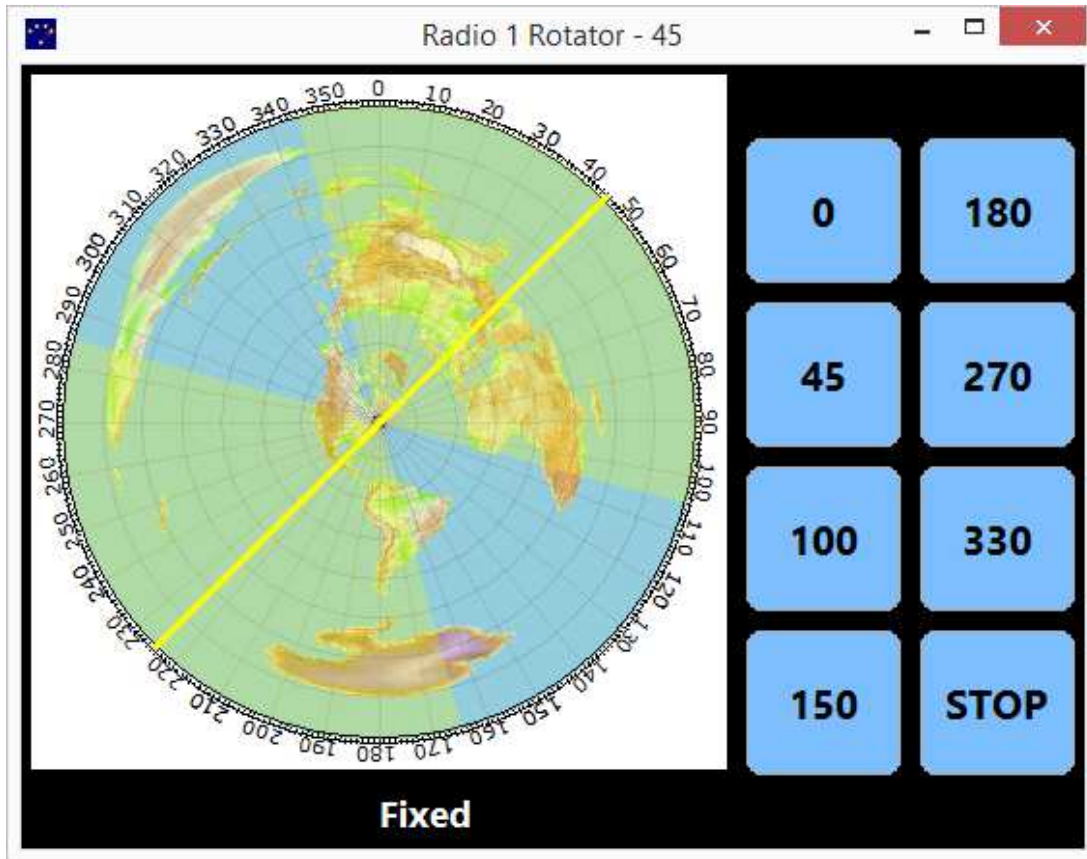
Direction buttons can be placed at the left, right, top, or bottom of the compass:



The button presets are configurable. Any direction can be placed on a preset.

Note that the pointer contains a heavier line segment. This is the direction of the rotator. If the antenna is known to have an offset from the rotator (for example if it is mounted at right angles to other antennas on the rotator) the heavy line will not point in the same direction as the longer line.

If a no rotatable antennas fit the selection then a fixed antenna can optionally be shown. This is a fixed dipole which is a bidirectional antenna.

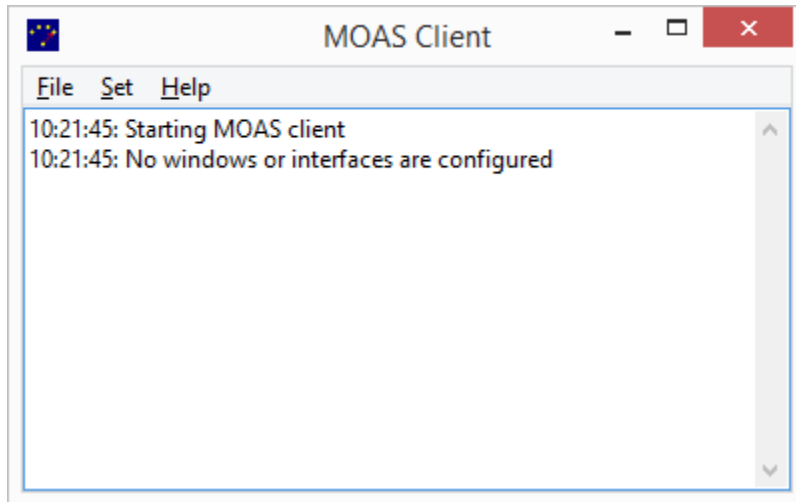


No short heavier line is shown because there is no rotator for this fixed antenna.

The Rotator Direction window can be run on any PC that can connect to the server. The only restriction is that if it is not on the same PC as the logging program it cannot be set to display the antennas for the radio with logging focus.

4. Client Window

When the MOAS Client starts up it displays the client window.



There are three menus plus an enhanced system menu and the traditional minimize, iconize, and close buttons. There is also a logging area which shows operational information and errors.

4.1. File Menu

The file menu contains the file oriented and configuration items.

4.1.1. Configure

Opens a dialog for configuring logging program interfaces, antenna display and selection, and rotators.

4.1.2. Reset

Closes and reopens network and logging program connections. Also closes and recreates all antenna display, selection, and rotator windows. If something isn't working right this is the quick thing to try.

4.1.3. Load

Loads the configuration from a file. This replaces the current configuration.

4.1.4. Save

Saves the current configuration to a file.

4.1.5. Exit

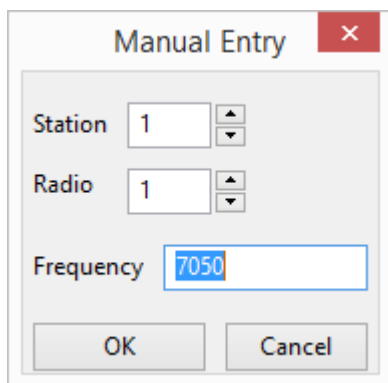
Exits the MOAS Client.

4.2. Set Menu

The Set menu sets values for the server.

4.2.1. Frequency

Displays the Manual Entry window. This is intended for testing and situations where a logging program is not running or is not communicating with the radio.



If this window is used while a logging program is communicating with the MOAS Client then the frequency may be changed by the logging program at any time – the interaction between this command and the logging program interface is not specified.

4.2.2. Freeze Windows

When this option is selected all Antenna Display, Antenna Selector, and Rotator Direction windows cannot be moved or resized.

4.2.3. No Mouse Focus

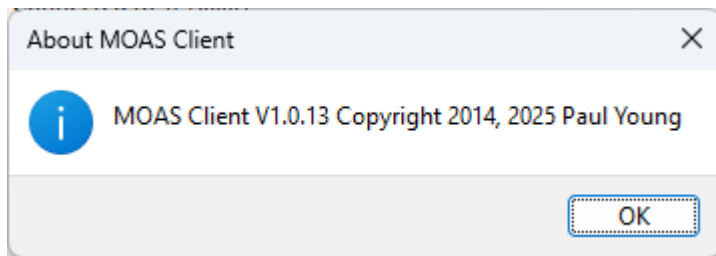
When this option is selected all Antenna Display and Antenna Selector windows will not take keyboard focus if the window which has keyboard focus is not part of the MOAS client. Rotator Direction windows will not take keyboard focus unless they are configured for keyboard direction input.

4.3. Help Menu

The help menu provides helpful information. The best source of help is this manual.

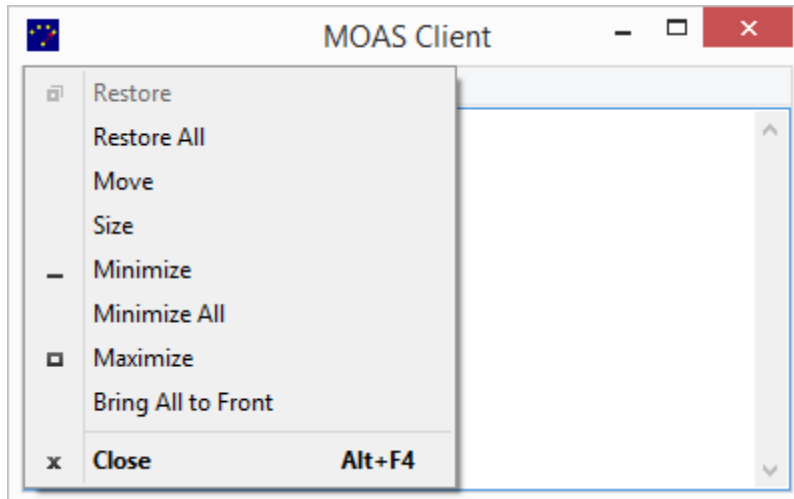
4.3.1. About

Shows the current version of the MOAS Client.



4.4. System Menu

The system menu is accessed by clicking on the icon at the upper left of the window. It is available on the client window, antenna display windows, antenna selector windows, and rotator direction windows.



There are three additional entries in this menu. They will affect all antenna display, antenna selector, and rotator windows. They do not affect the client window.

4.4.1. Restore All

Restores all minimized antenna display, antenna selector, and rotator direction windows.

4.4.2. Minimize All

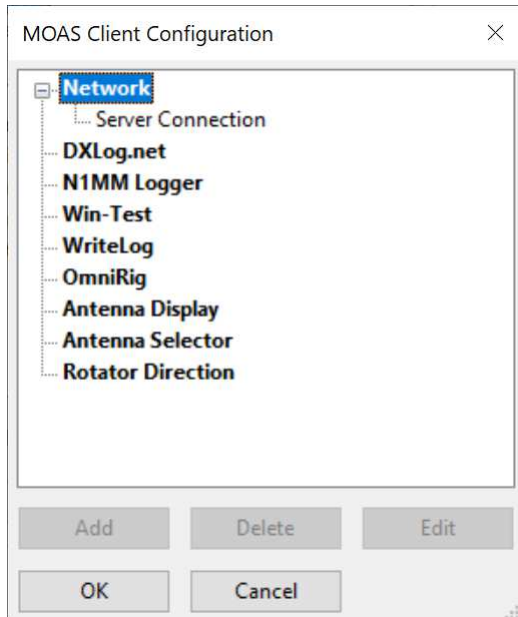
Minimizes all antenna display, antenna selector, and rotator direction windows.

4.4.3. Bring All to Front

Brings all antenna display, antenna selector, and rotator direction windows to the front.

5. Configuration

Select File -> Configure to display the configuration dialog:

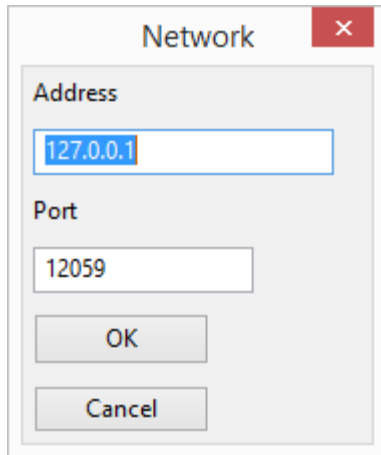


This shows the various things that can be configured. It is not necessary to configure all of them. For example if you might run this on the computer where your logging program is running and configure only a logging program interface.

Some items, such as the logging interfaces can only have one copy. Some, such as antenna selection can have several. There will always be one network interface. If an item only allows one copy the Add button will be grayed out when there is one copy.

5.1. Network Interface

The network interface connects the MOAS Client to the server. There must be one network interface. It needs the IP address and port number of the MOAS Server.



If the server is running on the same PC as the client then the default address will probably work. Otherwise it must be the IP address of the PC that is running the server.

The default port number is the same as the default for the server. You should not need to change it unless you have changed the server port number.

5.2. Logging Program Interfaces

The MOAS Client can interface with the most popular contest logging software.

The server refers to all radios by the station number and radio number. The interface must be configured so that when it knows which station number and radio number to use when it sends frequency or antenna direction information to the server.

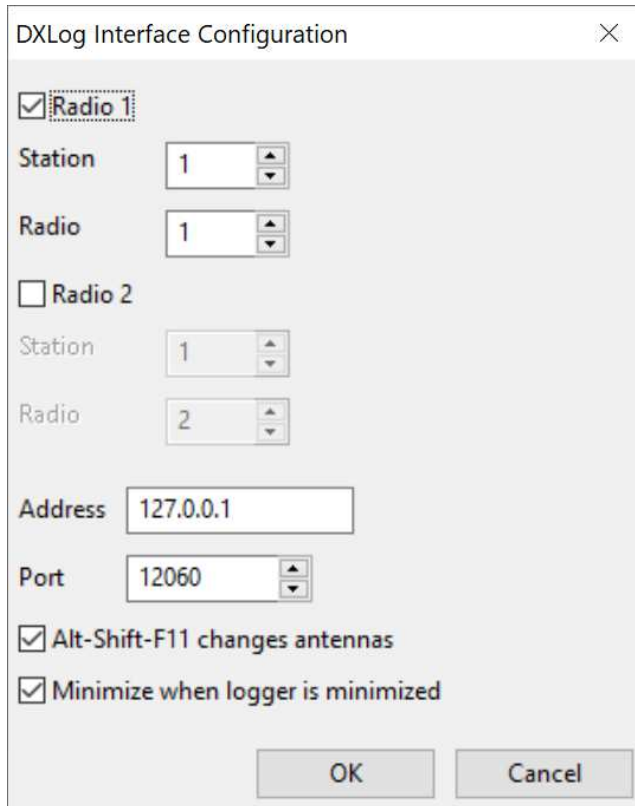
In a single operator station usually the server is configured so the only station is station 1 and the radio is radio 1 or if SO2R the radios are radio 1 and radio 2. For a multi-op usually each computer running a logging program is given a different station number.

Configuring a logging program interface involves specifying the station and radio numbers to use and providing whatever information is necessary for the MOAS Client to receive information from the logging program. The latter information is different for each logging program.

It is recommended that the logging interface be run on the same PC as the logging program. Otherwise some capabilities will not be available and reliability may suffer. For WriteLog and OmniRig the MOAS Client with the logging interface must be run on the same PC as the logging program.

5.2.1. DXLog.net

The client works with DXLog.net 2.4.15 or later.



Radio 1 and Radio 2

For normal SO1R or SO1V operation select Radio 1. Select both Radio 1 and Radio 2 for SO2R when the logging program is controlling two radios.

Set the station and radio numbers to the numbers the MOAS server uses for these radios.

Address and Port

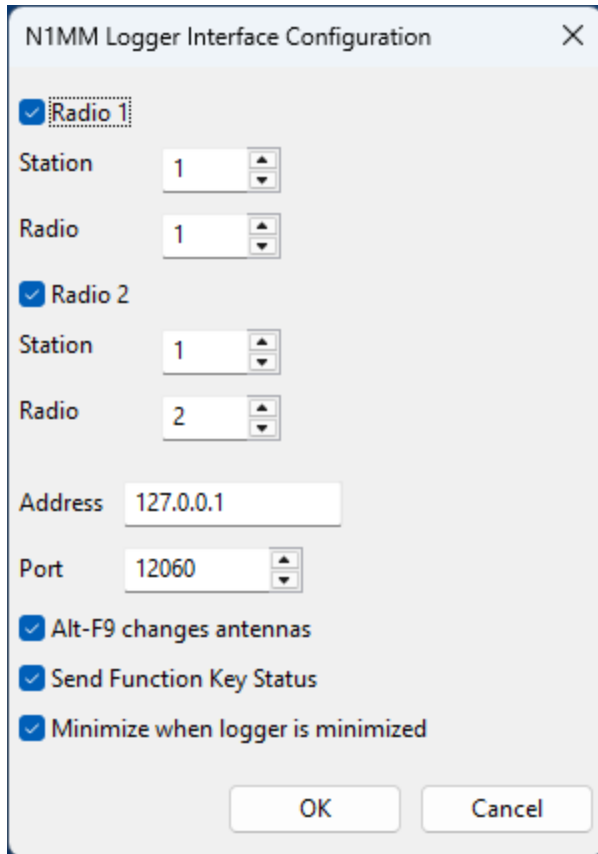
The address and port must be in the list of addresses and ports set for Radio UDP broadcast in DXLog. If DXLog is going to change antenna direction then the address and port must be in the list of addresses and ports set for Direction UDP broadcast. These are set in the Network Parameters dialog which is accessed through the NETCONFIG command or the Options menu. Also Radio information and Antenna Direction must be checked in the Broadcast section of the Options menu.

Alt-Shift-F11 changes antennas

If Alt-Shift-F11 changes antennas is checked then pressing Alt-Shift-F11 in DXLog will change to the next antenna.

5.2.2. N1MM Logger Client

The client works with N1MM Logger and with N1MM Logger Plus. Not all features are available with the older N1MM Logger.



Radio 1 and Radio 2

For normal SO1R or SO1V operation select Radio 1. Select both Radio 1 and Radio 2 for SO2R when the logging program is controlling two radios.

Set the station and radio numbers to the numbers the MOAS server uses for these radios.

Address and Port

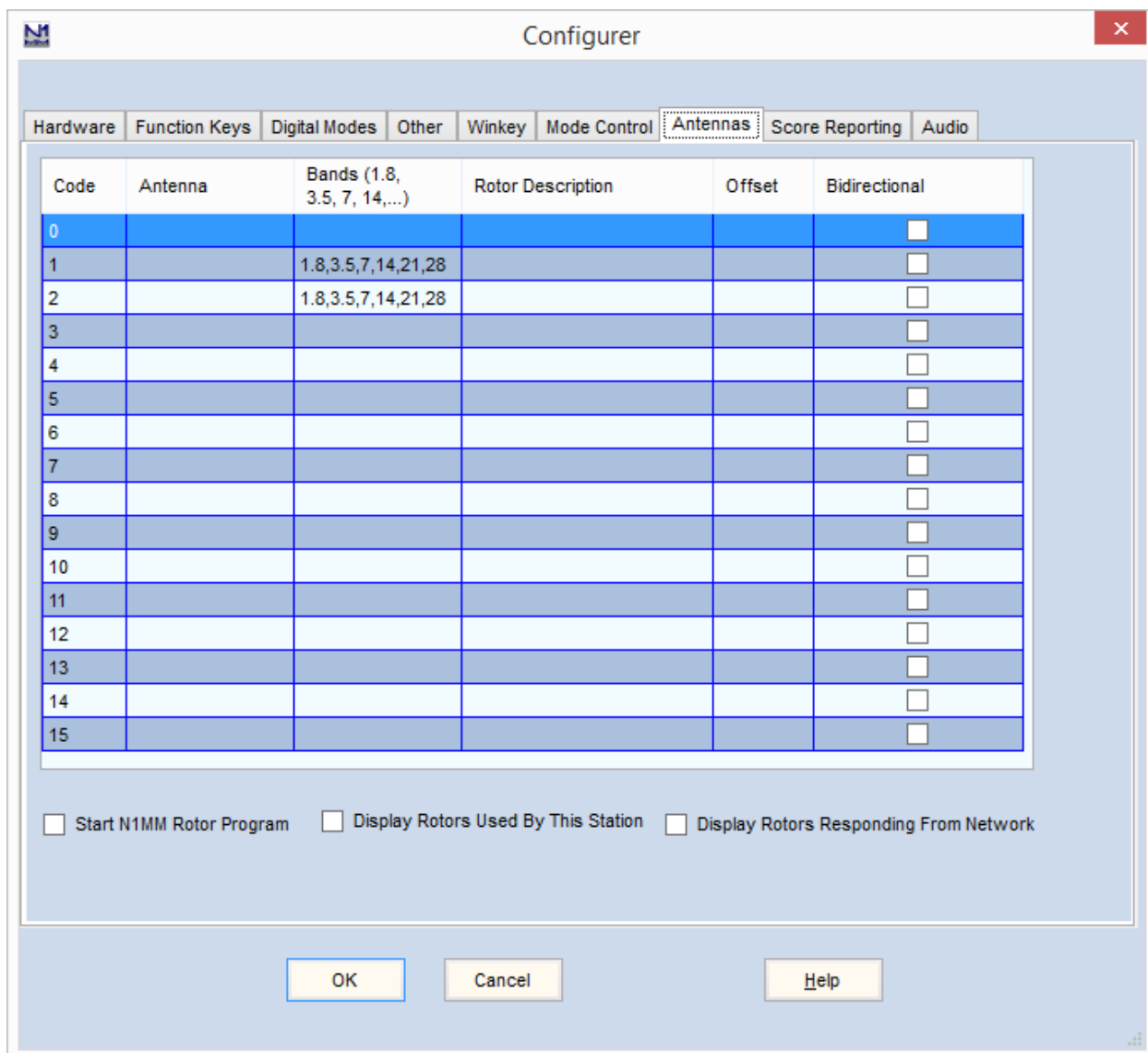
The address and port must match those in N1MM Logger.ini. The values shown are the defaults.

Alt-F9 changes antennas

If Alt-F9 changes antennas is checked then pressing Alt-F9 in N1MM Logger will change to the next relative antenna. This requires some configuration in N1MM Logger.

Two antennas must be configured in the Antennas tab of the N1MM Logger Configurer. They do not need names or anything else. But they must include the bands where Alt-F9 will be used. This is an example which will work for any antennas on 80-10 meters. The number of antennas available has nothing to do with the number of antennas configured in N1MM Logger. This configuration will cycle through any number of available antennas.

Note: If the logging program is set for SO2R then three antennas must be configured this way.



Alt-F9 is very effective if two antennas are available for a band. It will work with any number but it becomes cumbersome if more than about four antennas are available.

Send Function Key Status

When N1MM Logger transmits it broadcasts the F-key pressed. If Send Function Key Status is checked then the function key information is sent to the MOAS server. The server sends it to the appropriate clients which can display it in the Antenna Selector windows.

Minimize when logger is minimized

If Minimize when logger is minimized is checked then when N1MM Logger is minimized the MOAS II client will minimize all Antenna Display, Antenna Selector, and Rotator windows. They will be restored when the N1MM Logger is restored. This only works if the client and logger are running on the same PC.

N1MM Logger broadcast configuration

N1MM Logger does not normally broadcast the information needed by the MOAS Client. Add this to N1MM Logger.ini:

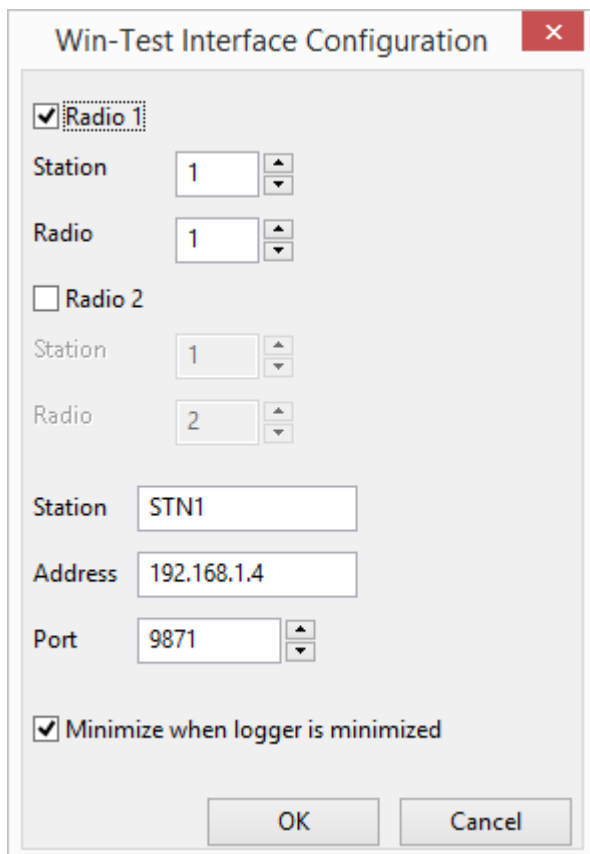
```
[ExternalBroadcast]
DestinationIPs=127.0.0.1
DestinationPort=12060
IsBroadcastRadio=True
```

This assumes that N1MM Logger and the MOAS Client are running on the same PC. If not, change the DestinationIPs line to include the IP address of the PC where the MOAS Client is running.

5.2.3. Win-Test Client

This works with Win-Test V4. It has not been tested with earlier versions.

If the client is not run on the same PC as the logging software it will not be able to determine which radio is active in SO2R configurations.



The image shows a dialog box titled "Win-Test Interface Configuration" with a close button (X) in the top right corner. The dialog contains the following settings:

- Radio 1
 - Station: 1 (dropdown)
 - Radio: 1 (dropdown)
- Radio 2
 - Station: 1 (dropdown)
 - Radio: 2 (dropdown)
- Station: STN1 (text input)
- Address: 192.168.1.4 (text input)
- Port: 9871 (dropdown)
- Minimize when logger is minimized

At the bottom of the dialog are "OK" and "Cancel" buttons.

Radio 1 and Radio 2

For normal SO1R or SO1V operation select Radio 1. Select both Radio 1 and Radio 2 for SO2R when the logging program is controlling two radios.

Set the station and radio numbers to the numbers the MOAS server uses for these radios.

Station address and port

The address should be the address of the computer which is running Win-Test.

The client may set the address for you. If not, or if it sets the wrong address there are several ways to find the correct address. One way is to start a command window and to type the IPCONFIG command. Look for the IP V4 Address. This is what you want unless you have a complex network topology.

If your computer has virtual networks or multiple active network interfaces then you should pick the network which matches the broadcast address Win-Test shows in the Interfaces Configuration dialog.

The port number must match the port number specified in the Win-Test Interfaces Configuration dialog. By default this number is 9871.

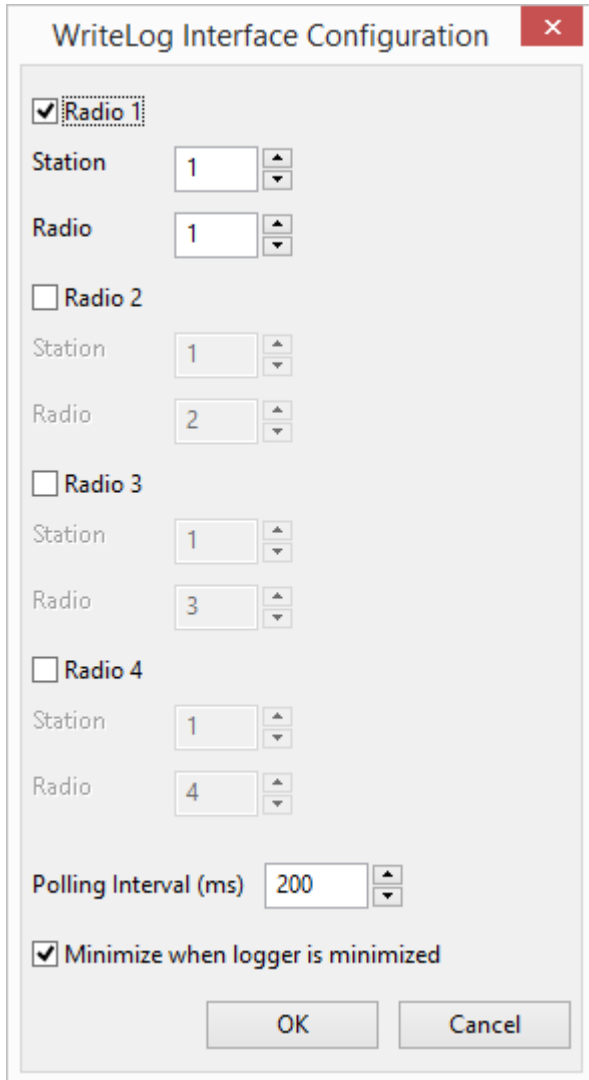
Minimize when logger is minimized

If Minimize when logger is minimized is checked then when Win-Test is minimized the MOAS II client will minimize all Antenna Display, Antenna Selector, and Rotator windows. They will be restored when the Win-Test is restored. This only works if the client and logger are running on the same PC.

5.2.4. WriteLog Client

This client works with WriteLog V11.23 or later. It works with older clients but it has not been tested.

The client must be run on the same PC as the logging software.



Radio 1, Radio 2, Radio 3, and Radio 4

WriteLog is capable of controlling up to four radios. For normal SO1R or SO1V operation select Radio 1. Select both Radio 1 and Radio 2 for SO2R when the logging program is controlling two radios. Select Radio 3 or Radio 4 if you have additional radios being controlled by WriteLog.

Set the station and radio numbers to the numbers the MOAS server uses for these radios.

Polling Interval

The polling interval controls how often the client checks the frequencies in WriteLog. A longer polling interval reduces computer overhead but will increase the time between changing bands and the server changing antennas.

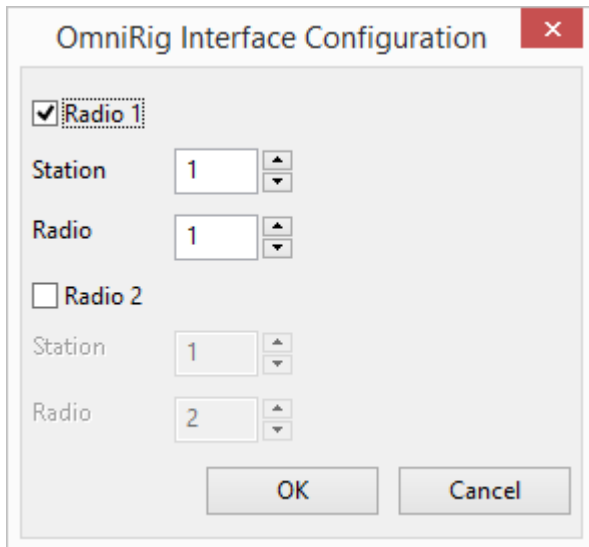
5.2.5. *OmniRig*

OmniRig is not a logging program. It provides frequency information to the MOAS client. It can be used if a logging program is not being used or if the logging program does not control the radios.

This client works with OmniRig V1.15 or later.

The client must be run on the same PC as the logging software.

The Omni-Rig program must be run to configure the serial port interfaces and to set the radio type. Once this is done it is not necessary to start Omni-Rig because the MOAS Client will start the component it needs.



Radio 1 and Radio 2

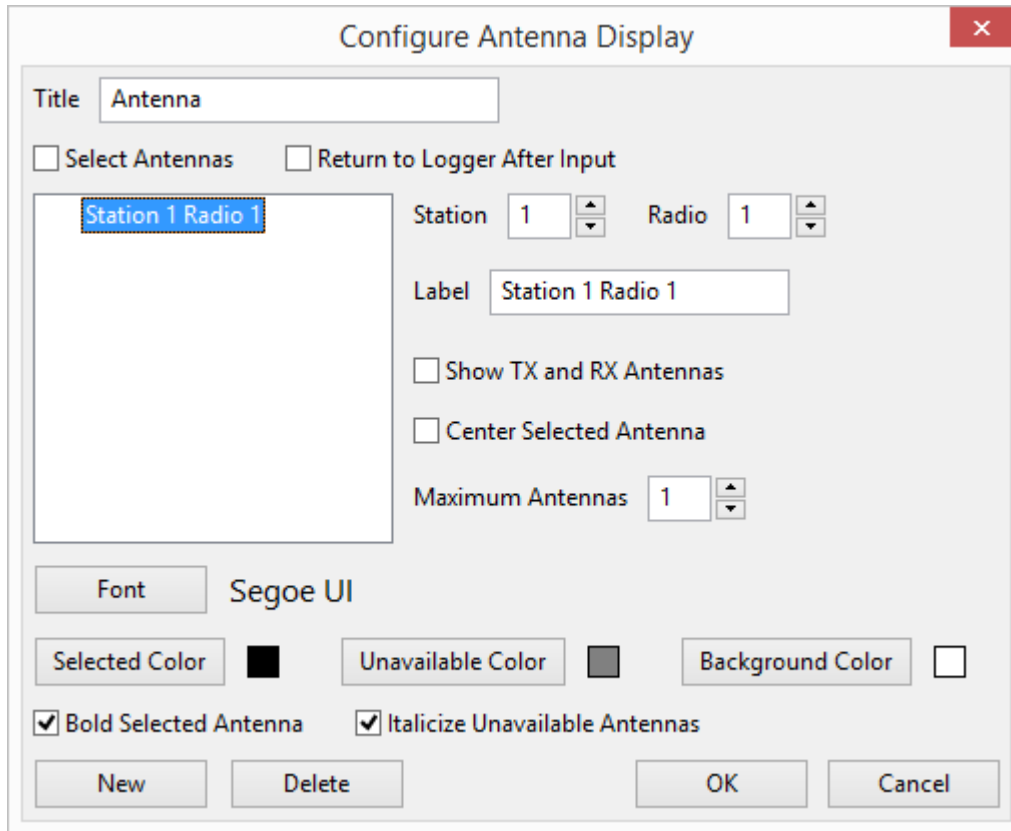
If the computer is connected to one radio select Radio 1. Select both Radio 1 and Radio 2 if the computer is connected to two radios.

Set the station and radio numbers to the numbers the MOAS server uses for these radios.

OmniRig cannot provide focus information. If an antenna display, antenna selector, or rotator window is configured to show information for the radio with logger focus it will show Radio 1 unless Radio 1 is not checked, in which case it will show radio 2.

5.3. Antenna Display

This is the dialog used to configure an antenna display:



Set the **Title** text to the text you want to be shown in the title of the Antenna Display window.

Check the **Select Antennas** box if you want clicking on an antenna to select it if it is available.

Check the **Return to Logger After Input** box if you want the keyboard focus to be returned to the logging program's active radio entry window when an antenna is clicked.

The Antenna Display window can show antennas for multiple radios. Each radio is displayed in a separate section. Click the **New** button to add a section. Click the section you want to configure in the list box. Click **Delete** to delete the selected section. The information to the right of the list box can be configured differently for each section:

Set the **Station** and **Radio** boxes to the station and radio numbers for the station you want to show antennas for.

Set the **Label** to the text that should appear above the antennas.

Check the **Show TX and RX Antennas** box if you want to show both antennas when they are different in a window that is showing one antenna.

Check the **Center Selected Antenna** box if you want the selected antenna to be displayed in the center of the window section.

Set **Maximum Antennas** to the number of antennas you wish to display. If you just want to display the currently selected antenna set it to 1. If you want to display all available antennas set it to the largest number of configured antennas you have on any band that you will use with this radio.

Click the **Font** button to set the text font, size, and the color to use for an antenna which can be selected.

Click the **Selected Color** button to set the text color to use for an antenna which has been selected.

Click the **Unavailable** Color button to set the text color to use for an antenna which cannot be selected.

Click the **Background Color** button to set the background color.

Check the **Bold Selected Antenna** box if you want the selected antenna to be displayed in bold type.

Check the **Italicize Unavailable Antennas** box if you want the antennas which are cannot be selected to be shown in italics.

5.4. Antenna Selector

This is the dialog that is used to configure an antenna selector:

Configure Antenna Selector

Title Background Color

Show Frequency in Title Show Radio in Title

Return to Logger After Input Allow Resizing

Selection

Station with Logger Focus Station Radio

Display

Show Antenna Name Show RX Antenna Show RX Only

Antenna Font

Show Logger Messages Station Radio

Logger Font Timeout

Transmit and Recieve Buttons

Show TX and RX Buttons

Transmit and Receive Labels

TX Label RX Label

Exclusive Selection

Double Click Right Click or Touch and Hold

Selection Buttons

Rows Columns

No Gap Gap After

Normal

Transmit / Receive Status

Show TX/RX state

Inoperative Color Inhibited Color

Receive Color Transmit Color

Set the **Title** text to the text you want to be shown in the title of the Antenna Display window.

Click the **Background Color** button to set the background color.

Check the **Show Frequency in Title** box if you want the frequency to be displayed in the window title.

Check the **Show Radio in Title** box if you want the radio number to be displayed in the window title.

Check the **Return to Logger After Input** box if you want the keyboard focus to be returned to the logging program's active radio entry window when an antenna is clicked.

The selector can display the antennas for a specific radio. Or it can show the antennas for the radio that has the logging program focus. It can only show the latter if it is running on the same computer as the logging program. Check the **Station With Logger Focus** box if you want the selector to show the antennas for the station that has logging focus. Otherwise set the **Station** and **Radio** to the one you want to display.

Check the **Show Antenna Name** box if you want the antenna name to be displayed in the upper left of the selector window.

Check the **Show RX Antenna** box if you want to show the receive antenna when it is different than the transmit antenna.

Check the **Show RX Only** box if you want to only show the receive antenna name. This can be useful if the antenna selector is for a sub receiver.

Click the **Antenna Font** button to set the font, size, and color of the antenna name text.

Check the **Show Logger Messages** box if you want to show messages from the logging program. N1MM Logger Plus will show the key pressed when transmitting a message. Set the **Station** and **Radio** to the one you want to display messages from. Click the **Font** button to set the font, size, and color of the message text. Set the **Timeout** to the minimum amount of time the message should be displayed.

Check the **Show TX and RX Buttons** box if you want to add transmit and receive buttons to the upper right of the window. These buttons can be used to select an antenna for transmit only or receive only if the configuration allows this.

Click **Configure TR Buttons** to display a dialog where you can set the size, shape, colors, and font of the TX and RX buttons. See section 4.4.1 for details.

The **TX** and **RX** labels are the text for the TX and RX buttons. They are also used to label the transmit and receive antennas if antennas are being shown and the transmit and receive antennas are different.

Check the **Double Click** box if you want to be able to exclusively select an antenna by double-clicking a button.

Check the **Right Click or Touch** box if you want to be able to exclusively select an additive antenna by right clicking a button or by touching and holding the button if it is displayed on a touch-sensitive screen.

Set the **Rows** and **Columns** for the button grid.

Click **Configure Buttons** to display a dialog where you can set the size, shape, colors, stripes, and font of the buttons. See section 4.4.2 for details.

Select **Gap After Row** or **Gap After Column** if you want a larger gap between two rows or between two columns. Select **No Gap** if you do not want a wider gap.

Select **Normal** if you want the buttons presented as they are configured on the server. Select **Rotate 90**, **Rotate 180**, **Rotate 270**, **Flip Vertical**, **Flip Horizontal**, **Rotate 90 Flip Horizontal**, or **Rotate 90 Flip Vertical** to rotate or flip the layout.

Select Show TX/RX state if you want to show the transmit / receive state in the window.

Select **Background** if you want to status to change the color of the window background. Select **TX Antenna** if you want the status to change the color of the background of the transmit antenna name. Select **TX & RX Antennas** if you want the status to change the color of the background of the transmit and receive antenna names.

Click **Inoperative Color** to set the color when the server cannot communicate with the switch hardware.

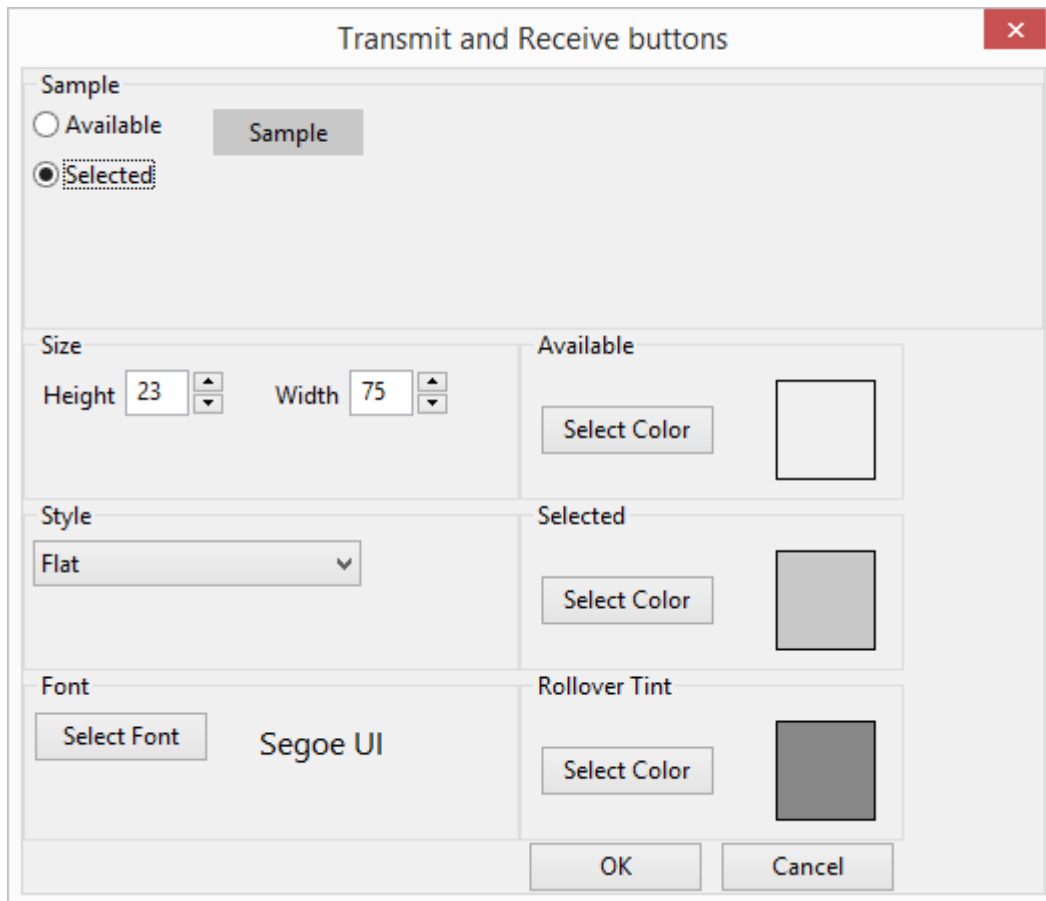
Click **Inhibited Color** to set the color when the radio is inhibited from transmitting.

Click **Receive Color** to set the color when the radio is receiving and is allowed to transmit.

Click **Transmit Color** to set the color when the radio is transmitting.

5.4.1. Transmit and Receive Buttons

This is the dialog which appears when Configure TR Buttons is clicked:



The default color for Available may be the same color as the dialog background which may be confusing when looking at the sample. Unless you set the Selection window background to this same color it will not be a problem.

Select **Available** or **Selected** to set the sample button to the normal state or the state when it has been clicked.

Set the **Height** and **Width** to the desired size.

Select **Flat**, **Flat Rounded**, **Flat With Border**, **Flat Rounded With Border**, or **3D** to choose the button style you prefer.

Click the **Select Font** button to set the font, size, and color of the button text.

Click the **Select Color** button in the Available box to choose the color the button should show when it has not been clicked.

Click the **Select Color** button in the Selected box to choose the color the button should show when it has been clicked.

Click the **Select Color** button in the Rollover Tint box to choose the color to tint the button when the mouse cursor is on it. Usually a light or dark gray is appropriate but any color can be used. It is currently not possible to tint a pure white button.

5.4.2. Antenna and Function Buttons

This is the dialog which appears when Configure Buttons is clicked:

Select **Unavailable**, **Available** or **Selected** to set the sample button to the antenna unavailable, antenna available, or antenna selected state.

Set the **Height** and **Width** to the desired size.

Select **Flat**, **Flat Rounded**, **Flat With Border**, **Flat Rounded With Border**, or **3D** to choose the button style you prefer.

Check the **Top and Bottom are the Same** box if you want the status to be combined instead of having transmit on top and receive on the bottom. If this is checked the entire box will show the selected color if the antenna is selected for either transmit or receive or the available color if it is available for transmit or receive.

Select **Stripes** if you want the selected antenna to be indicated by a stripe on the button. Select **Color** if you want the selected antenna to be indicated by a different color.

If you have selected **Stripes** the set the **Stripe Width**. A width of 1 is narrow, larger numbers are wider.

If you have selected **Stripes** check the **Same Color** box if you want the top and bottom stripes to be the same color.

Click the **Select Font** button to select the font, size, and color of the button text.

Click the **Select Color** button in the Unavailable box to select the color the button should show when the antenna is not available.

Click the **Select Color** button in the Available box to select the color the button should show when the antenna is available.

If you have selected **Color** for the selected antenna click the **Select Color** button in the Selected box to select the color the button should show when the antenna is selected.

If you have selected **Stripes** for the selected antenna click the **Select Color** button in the Top Stripe box to select the color the top stripe should show when the antenna is selected.

If you have selected **Stripes** for the selected antenna and the Same Color box is not checked click the **Select Color** button in the Bottom Stripe box to select the color the bottom stripe should show when the antenna is selected.

Click the **Select Color** button in the Rollover Tint box to choose the color to tint the button when the mouse cursor is on it. Usually a light or dark gray is appropriate but any color can be used. It is currently not possible to tint a pure white button.

The highlight color is not currently used because the server does not yet have any functions which highlight buttons.

5.5. Rotator Direction

This is the dialog that is used to configure a Rotator Direction window:

The screenshot shows the 'Configure Rotator Direction' dialog box. The title bar reads 'Configure Rotator Direction'. The dialog is organized into several sections:

- Title:** A text box containing 'Rotator'.
- Display Options:** Checkboxes for 'Show Window if no Rotator' (checked), 'Return to Logger After Input' (checked), 'Show Rotator Name in Title' (unchecked), and 'Show Direction in Title' (unchecked). A 'Background Color' button is also present.
- Rotator Selection:** A dropdown menu set to 'In use by station with logger focus', 'Station' (1), 'Radio' (1), 'Name' (text box), 'Rotator' (1), 'Buttons' (unchecked), 'Rows' (2), 'Columns' (3), 'Configure Buttons' (button), and 'Use Antenna Offset' (unchecked).
- Show Fixed Antennas:** 'Show Fixed Antennas' (unchecked) and 'Fixed' (Fixed).
- Direction Buttons:** A dropdown menu set to 'Bottom', 'Rows' (2), 'Columns' (3), 'Row 1 Column 1' (dropdown), radio buttons for 'CCW', 'CW', 'Stop', and 'Heading' (selected), and a 'Heading' value of 0.
- Compass Display:** 'Medium' (dropdown), 'Allow Input' (checked), 'Pointer Length' (90), 'Number of Rotators' (1), 'Show Rotator Names' (unchecked), 'Font' (Segoe UI), 'Show Beamwidth' (unchecked), and 'Show All Lobes' (checked).
- File:** A text box and a 'Browse' button.
- Pointers:** Four color selection buttons: 'Pointer 1' (red), 'Pointer 2' (green), 'Pointer 3' (blue), and 'Pointer 4' (yellow).
- Digital Display:** 'Show Degrees' (checked), 'Allow Input' (unchecked), 'Configure Button' (button), 'Button Text' (Rotate), and 'Font' (Segoe UI).
- Buttons:** 'OK' and 'Cancel' buttons at the bottom right.

Set the **Title** text to the text you want to be shown in the title of the Rotator Direction window.

Check the **Show Window if no Rotator** box if you want the rotator window to stay visible if there is no rotator to display.

Check the **Return to Logger After Input** box if you want the keyboard focus to be returned to the logging program's active radio entry window when a rotator direction is changed.

Check the **Show Rotator Name in Title** box if you want the rotator's name to be displayed in the window title.

Check the **Show Direction in Title** box if you want the direction to be displayed in the window title.

Click the **Background Color** button to set the background color.

There are several choices for selecting which rotator to display.

If the choice specifies a station then antenna beamwidth, offset, and number of lobes are available. A station can be specified by station and radio number or as the station with logger focus.

The choices for station with logger focus only work properly if the client is running on the same PC as the logging program and is running the logging program interface.

It is possible that any of these choices will match more than one rotator. If this happens rotator selection buttons can be used to select one of the rotators, or the rotator number can differentiate between them, or the compass can be configured to show more than one rotator.

These are the choices:

Select **All** if you want to show all rotators.

Select **By Name** and fill in the **Name** if you want to show a specific rotator.

Select **Available for specified station** if you want to show the rotators which are used by the available antennas for a specific station. Set the **Station** and **Radio** to the station and radio to be displayed.

Select **In use by specified station** if you want to show the rotators for the antennas selected by a specific station. Set the **Station** and **Radio** to the station and radio to be displayed.

Select **Available for station with logger focus** if you want to show the rotators used by the available antennas for the station that has logging focus.

Select **In use by station with logger focus** if you want to show the rotators for the selected antennas for the station that has logging focus.

Set the **Rotator** to the number of the selection that should be used. For example if it is set to 1 the first rotator selected will be used and if it is set to 2 the second will be used. If the station has more than one rotator which will be shown it is possible to create several Rotator Direction windows, one for the first rotator, one for the second etc.

If you want to select the rotator by using a grid of buttons:

Check the **Buttons** box.

Set the number of **Rows** and **Columns** for the buttons.

Click **Configure Buttons** to display a dialog where you can set the size, shape, colors, and font of the rotator selection buttons. See section 4.5.1 for details.

Check the **Show Fixed Antennas** box if you want to show the direction of a fixed antenna if no antenna with a rotator will be shown. Set the **Fixed** text to the name to be displayed when a fixed antenna is shown. This is only available when the rotator is selected if the antenna choice specifies a station.

Direction buttons can be placed at the top, bottom, left, or right of the direction indicators.

If you want to display direction buttons:

Select **Bottom**, **Left**, **Right**, or **Top**.

Set the number of **Rows** and **Columns**.

For each button:

Select the Row and Column , for example **Row 1 Column 1**.

Select **CCW**, **CW**, **Stop** or **Heading**. If you select **Heading** set the number of degrees for this button.

Set the text for the **CCW**, **CW**, and **Stop** buttons.

Click **Configure Buttons** to display a dialog where you can set the size, shape, colors, and font of the rotator direction buttons. See section 4.5.1 for details.

If you want to display or change the direction of rotators using a compass:

Select **Small**, **Medium**, **Large** or **Custom**.

If you selected **Custom** then select a **File**, either by typing in the file specification or by clicking the **Browse** button and finding it. The file must be a Portable Network Graphics (PNG) file. It should be square. The size of the file will determine the display size.

Click **Allow Input** if you want to be able to change the direction of the antenna by clicking on the compass.

Set the **Pointer Length**. The number is the percentage of the distance from the center to the edge of the compass. The default is a good choice for the supplied compass. If you supply a custom image you may want to pick a different length.

Set the Number of Rotators to the number of rotators you want to display on the compass. The maximum is 4.

Check the **Show Rotator Names** box if you want the rotator names to be shown below the compass. If input is allowed and more than one rotator can be shown a check box will be placed to the left of each rotator name. If the box is checked that rotator will be turned when the compass is clicked.

Click on **Pointer 1**, **Pointer 2**, **Pointer 3**, or **Pointer 4** to set the color of the pointer.

If you want to display the direction as a number or to type a number to change the direction:

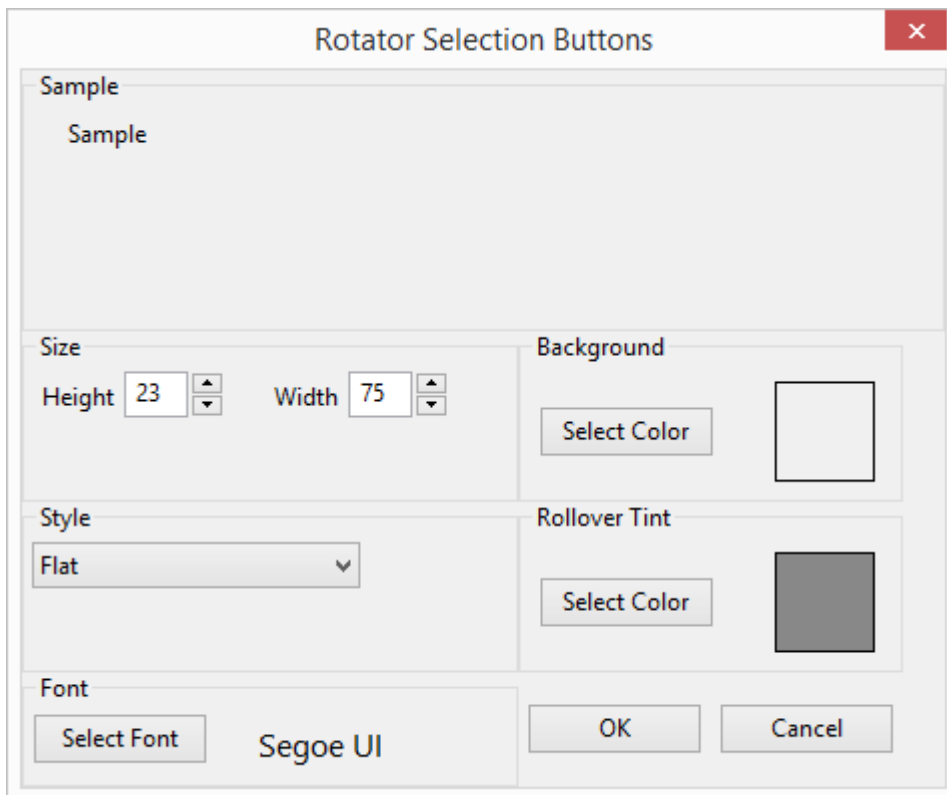
Check the **Show Degrees** box.

Check the **Allow Input** box if you want to be able to enter a heading. Click **Configure Buttons** to display a dialog where you can set the size, shape, colors, and font of the rotate button. See section 4.5.1 for details. Enter the text for the rotate button in the **Button Text** field.

Click the **Font** button to select the font, size, and color of the direction display.

5.5.1. Button Configuration

The dialogs for the Rotator Selection Buttons, the Direction Buttons, and the Rotate Button are the same except for the window title:



Set the **Height** and **Width** to the desired size.

Select **Flat**, **Flat Rounded**, **Flat With Border**, **Flat Rounded With Border**, or **3D** to choose the button style you prefer.

Click the **Select Font** button to set the font, size, and color of the button text.

Click the **Select Color** button in the Background box to choose the color the button should show.

Click the **Select Color** button in the Rollover Tint box to choose the color to tint the button when the mouse cursor is on it. Usually a light or dark gray is appropriate but any color can be used. It is currently not possible to tint a pure white button.

6. Scripting

The MOAS client can receive messages from a scripting program. This can be used for various tasks including defining “hot keys” which will select an antenna or turn a rotator. It can also be used to activate the logging program’s entry window (and it will select the active station if SO2R).

6.1. Message Format

All messages are sent using PostMessage or SendMessage and a scripting program must have this capability. PostMessage takes a message number and two numeric arguments. They are directed to a MOAS Client window. SendMessage takes the same arguments but returns a number. It is used for queries.

The Antenna Display, Antenna Selector, and Rotator Direction windows accept messages for scripting.

Numbers in messages are zero-based. For example the first antenna in a list is antenna 0 and the top left button is row 0 column 0.

6.2. Antenna Display

The Antenna Display window accepts five messages.

6.2.1. No-Op

Message 32768 has no effect on any antennas or rotators. The arguments must be zero. The logging program’s entry window will become active.

6.2.2. Get Display Information

Message 32769 returns information about the antenna display window. The first argument describes the information to be returned. The second argument is the section.

These are the possible values for the first argument:

Number	Purpose
0	Return the number of sections. The second argument must be zero.
1	Return the station number for the specified section.
2	Return the radio number for the specified section.
3	Return the lower frequency for the specified section.

- 4 Return the upper frequency for the specified section.
- 5 Return the number of antennas displayed in the specified section
- 6 Return the number of antennas in the specified section

If an invalid operation or non-existent section is specified the returned value will be hexadecimal FFFFFFFF.

6.2.3. Get Antenna ID

Message 32770 returns the ID of a specific antenna. The first argument is the section. The second argument is the antenna within the section.

If a non-existent section is specified the returned value will be hexadecimal FFFFFFFF. If the antenna does not exist the returned value will be hexadecimal 0xFFFFFFFF.

6.2.4. Select Antenna

Message 32771 changes the selected antenna for a radio. The first argument is the section of the window (antenna display can show several sections). The second is the antenna within the section. Both of these start with zero (the first section is zero and the first antenna is zero).

The antenna display will not show all antennas if there are more antennas in a section than the section was configured for. And the display may be set to center the selected antenna. These are not used to determine which antenna is selected – the number for an antenna within the section will stay the same for an antenna regardless of which is displayed in the window.

This message will select an antenna even if the Antenna Display window will not allow selection by using a mouse.

6.2.5. Activate Function

Message 32772 activates a function, such as swapping antennas or saving the current selection. The first argument is the section of the antenna display window corresponding to the function. Normally this can be zero. The second argument is the ID of the function in the server configuration file.

6.3. Antenna Selector

The Antenna Selector window accepts two messages.

6.3.1. No-Op

Message 32768 has no effect on any antennas or rotators. The arguments must be zero. The logging program's entry window will become active.

6.3.2. Get Selector Information

Message 32769 returns information about the antenna selector window. The first argument describes the information to be returned. The second argument must be zero.

These are the possible values for the first argument:

Number	Purpose
0	Return the number of rows and columns. The number returned is the number of rows times 100 plus the number of columns.
1	Return the station number.
2	Return the radio number.
3	Return the lower frequency.
4	Return the upper frequency.

If an invalid operation is specified the returned value will be hexadecimal FFFFFFFF.

6.3.3. Get Button Information

Message 32770 returns information about the antenna selector button. The first argument describes the information to be returned. The second argument specifies the button as the row times 100 plus the column.

These are the possible values for the first argument:

Number	Purpose
0	Return the type of the button, zero if it is an antenna and one if it is a function.
1	Return one if this is an additive antenna such as a Yagi in a stack, zero otherwise.
2	Return the transmit and receive state. Zero is unavailable, one is available, and two is selected. The returned value is the transmit state times ten plus the receive state.
3	Return antenna or function ID.

If an invalid operation is specified or the number of rows or columns is more than selector contains the returned value will be hexadecimal FFFFFFFF. If a button does not have an antenna or function the returned value will be hexadecimal FFFFFFFE.

6.3.4. Select Antennas or Function

Message 32771 selects transmit and receive antennas or selects a function. The first argument is the transmit antenna or function and the second is the receive antenna.

The antenna or function is determined by the row and column where it appears in the Antenna Selector Window. The number is the row times 100 plus the column plus a modifier as follows:

Number	Purpose
0	Select this as the only antenna.
10000	If this antenna is part of an additive system (such as an antenna stack) select it in addition to the others already selected. If a different antenna system is selected or this is not part of an additive system then select it as the only antenna.
20000	If this antenna is part of an additive system (such as an antenna stack) deselect it if it is selected and if deselecting it would not result in no antennas being selected. Otherwise select it as the only antenna.
30000	If this antenna is part of an additive system (such as an antenna stack) select it if it is deselected and deselect it if it is selected (toggle the selection).
40000	Do nothing with this antenna (no-op). This is used for the receive antenna if selecting only a transmit antenna or vice-versa.

6.4. Rotator Direction

The Rotator Direction window accepts two messages.

6.4.1. No-Op

Message 32768 has no effect on any antennas or rotators. The arguments must be. The logging program's entry window will become active.

6.4.2. Get Rotator Information

Message 32769 returns information about the antenna rotator. The first argument describes the information to be returned. The second argument depends on the first.

These are the possible values for the first argument:

Number	Purpose
0	Returns the number of rotators displayed by the window. The second argument must be zero.
1	Returns the direction of the specified rotator. The argument is the rotator. Zero is the first rotator.

If an invalid operation or rotator greater than the maximum is specified the returned value will be hexadecimal FFFFFFFF. If an unused rotator is specified the returned value may be hexadecimal FFFFFFFE.

6.4.3. Direction

Message 32770 sets the direction of one or more rotators. The first argument is the heading. The second argument must be zero.

6.5. Examples

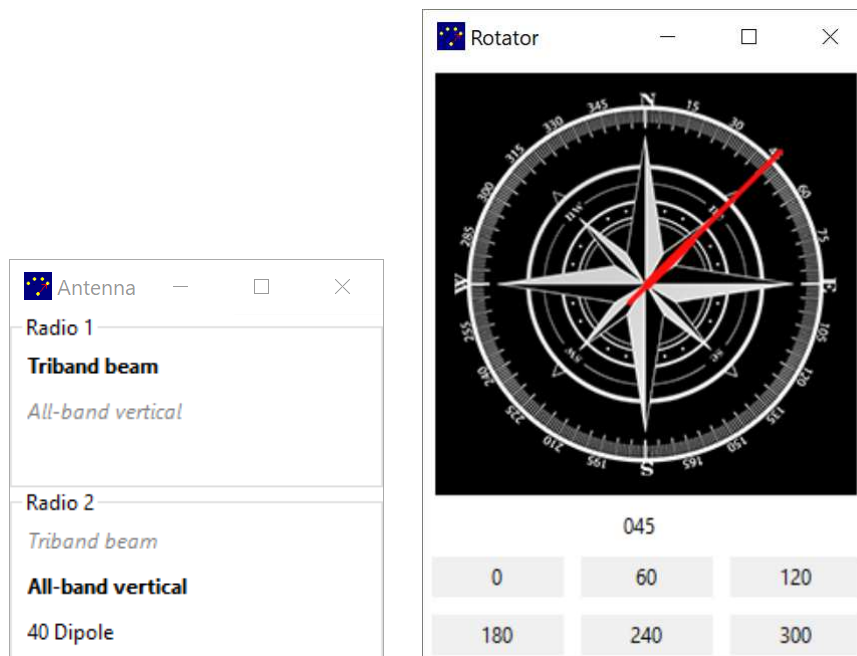
There are many scripting programs available. These examples use AutoHotkey which is a free scripting language that provides hot key capabilities.

These examples are provided to show how to script the MOAS Client and not as complete examples of AutoHotKey scripts. AutoHotKey has many powerful features and can assign a script to almost any key.

6.5.1. Small Station Example

The small station configuration is supplied as an example MOAS configuration. It has an all-band vertical, a triband beam, and dipoles for 40 and 80. There are at most three antennas available on any band. An antenna display with two sections and three antennas in each section will show all choices. The antenna display is named "Antennas".

The station has one rotator which is in a window named "Rotator".



Scripting will be used to select antennas and rotate the triband beam using the keyboard. The script shows the use of the commands to select an antenna and activate a function in a display window and to set a rotator direction.

The logging program does not use the WIN key for any commands. So WIN-F1 through WIN-F12 would be available for antenna and direction control. The assignments will be as follows:

Key	Purpose
WIN-F1	Select first antenna in display for Radio 1
WIN-F2	Select second antenna in display for Radio 1
WIN-F3	Select third antenna in display for Radio 1
WIN-F4	Swap the Radio 1 and Radio 2 antennas
WIN-F5	Select first antenna in display for Radio 2
WIN-F6	Select second antenna in display for Radio 2
WIN-F7	Select third antenna in display for Radio 2
WIN-F8	Swap the Radio 1 and Radio 2 antennas
WIN-F9	Turn tribander to 45 degrees
WIN-F10	Turn tribander to 180 degrees
WIN-F11	Turn tribander to 270 degrees
WIN-F12	Turn tribander to 330 degrees

This is an example script which would implement the above keys using AutoHotKey:

```
#NoEnv
#Warn
#SingleInstance Force
SendMode Input
SetWorkingDir %A_ScriptDir%

#F1::
    PostMessage, 32771, 0, 0, , Antennas
    Return

#F2::
    PostMessage, 32771, 0, 1, , Antennas
    Return

#F3::
    PostMessage, 32771, 0, 2, , Antennas
    Return

#F4::
    PostMessage, 32772, 0, 0, , Antennas
    Return

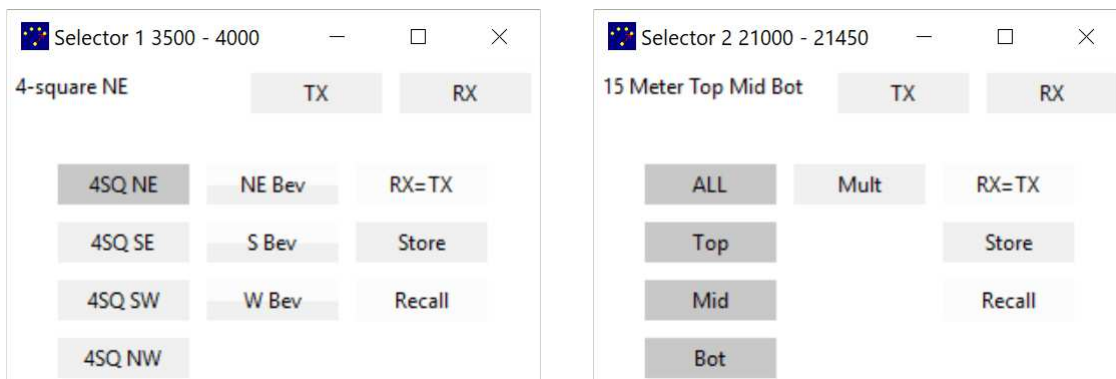
#F5::
    PostMessage, 32771, 1, 0, , Antennas
```

Return

```
#F6::  
  PostMessage, 32771, 1, 1, , Antennas  
  Return  
  
#F7::  
  PostMessage, 32771, 1, 2, , Antennas  
  Return  
  
#F8::  
  PostMessage, 32772, 0, 0, , Antennas  
  Return  
  
#F9::  
  PostMessage, 32769, 45, 0, , Rotator  
  Return  
  
#F10::  
  PostMessage, 32769, 180, 0, , Rotator  
  Return  
  
#F11::  
  PostMessage, 32769, 270, 0, , Rotator  
  Return  
  
#F12::  
  PostMessage, 32769, 330, 0, , Rotator  
  Return
```

6.5.2. Big Station Example

The big station configuration is supplied as an example MOAS configuration. It has vertical four-squares on 160 – 40 and multiple beams including stacks on 20 – 10. Two antenna selectors are named “Selector 1” and “Selector 2”.



This script is more complex than the simple station script. The behavior of the keys depends on the band and which antenna is selected. Pressing a key multiple times can switch between antennas or can activate or deactivate a receiving antenna.

Key	Purpose
WIN-F1	Select an antenna for Radio 1. For 80 and 160 select the NE 4-square. Toggle the NE beverage on and off if pressed again. For 40 select the beam. Switch between the beam and NE 4-square if pressed again. For 20 – 10 select the entire stack. Toggle between receiving on the full stack and only the bottom antenna (useful during rain static) if pressed again.

WIN-F2 through WIN-F4 would select the other 4-square directions and toggle the appropriate receive antennas and would select different stack combinations and the multiplier antenna. This is the part of the script for WIN-F1:

```
#NoEnv
#Warn
#SingleInstance Force
SendMode Input
SetWorkingDir %A_ScriptDir%

; Commands for Antenna Selector window
global GET_SELECTOR_INFO := 32769
global GET_BUTTON_INFO := 32770
global SELECT_ANT := 32771

; GET_SELECTOR_INFO operations
global GET_SELECTOR_LOWER_FREQ := 3

; GET_BUTTON_INFO operations
global GET_BUTTON_STATE := 2

; Button state
global BUTTON_SELECTED_TX_RX := 22

; Selection modifiers
global SELECTION_NOOP := 40000

; Buttons by row and column
R0C0 := 0
R0C1 := 1
R1C0 := 100
R1C1 := 101
R2C0 := 200
R2C1 := 201
R3C0 := 300
R3C1 := 301

; The antennas on the Selector
global ANT_4SQ_NE := R0C0
global ANT_4SQ_SE := R1C0
global ANT_4SQ_SW := R2C0
```

```

global ANT_4SQ_NW := R3C0

global ANT_BEV_NE := R0C1
global ANT_BEV_S := R1C1
global ANT_BEV_W := R2C1

global ANT_40_BEAM := R0C1

global ANT_ALL := R0C0
global ANT_TOP := R1C0
global ANT_MID := R2C0
global ANT_BOT := R3C0

global ANT_MULT := R0C1

; The names of the selector windows for radio 1 and radio 2
RADIO_1_WINDOW := "Selector 1"
RADIO_2_WINDOW := "Selector 2"

DoF1(selector)
{
    if !WinExist(selector)
        Return

    ; Get the frequency
    SendMessage, GET_SELECTOR_INFO, GET_SELECTOR_LOWER_FREQ, 0
    if ErrorLevel = FAIL
        Return
    frequency := ErrorLevel

    if (frequency = 1800) || (frequency = 3500)
    {
        ; See if the NE antenna is selected for transmit and receive
        SendMessage, GET_BUTTON_INFO, GET_BUTTON_STATE, ANT_4SQ_NE
        if ErrorLevel = FAIL
            Return

        if (ErrorLevel = BUTTON_SELECTED_TX_RX)
        {
            ; NE is selected, turn on NE beverage
            PostMessage SELECT_ANT, SELECTION_NOOP, ANT_BEV_NE
            Return
        }

        ; NE not selected or has beverage, select it
        PostMessage SELECT_ANT, ANT_4SQ_NE, ANT_4SQ_NE
        Return
    }

    if frequency = 7000
    {
        ; See if the beam is selected
        SendMessage, GET_BUTTON_INFO, GET_BUTTON_STATE, ANT_40_BEAM
        if ErrorLevel = FAIL
            Return
    }
}

```

```

    if (ErrorLevel = BUTTON_SELECTED_TX_RX)
    {
        ; Beam is selected is selected, switch to NE 4-square
        PostMessage SELECT_ANT, ANT_4SQ_NE, ANT_4SQ_NE
        Return
    }

    ; Beam is not selected, select it
    PostMessage SELECT_ANT, ANT_40_BEAM, ANT_40_BEAM
    Return
}

; 10, 15, 20 all have a three antenna stack
SendMessage, GET_BUTTON_INFO, GET_BUTTON_STATE, ANT_ALL
if ErrorLevel = FAIL
    Return

if (ErrorLevel = BUTTON_SELECTED_TX_RX)
{
    ; Whole stack is selected receive on lower only
    PostMessage SELECT_ANT, SELECTION_NOOP, ANT_BOT
    Return
}

; Stack is not selected, select it
PostMessage SELECT_ANT, ANT_ALL, ANT_ALL
Return
}

#F1::
    DoF1(RADIO_1_WINDOW)
    Return

```