

MOAS II

Client

Intelligent Antenna Switch

Version 1.0 DRAFT 1

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 almost certainly find better ways to set things up.
- 3 This is preliminary. The client may change in ways that are incompatible. It is most likely to change based on feedback from early users. So if you try something and it isn't to your liking or you have a better idea let me know!

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 N1MM Logger, Win-Test, and WriteLog.

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.

2. Antenna Display and Switching

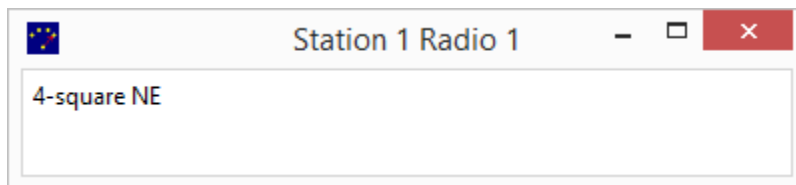
The MOAS client has two ways to display and select antennas. They can be displayed as a list or as a grid of buttons. The grid of buttons offers more powerful selection but the list is a simpler way of looking at what is selected.

2.1. Antenna Display

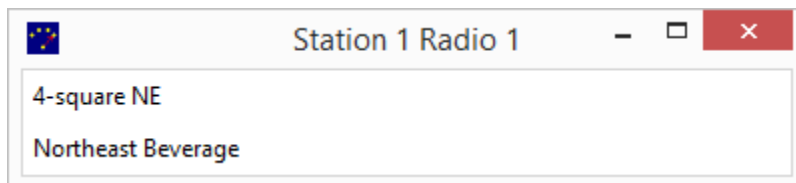
The Antenna Display windows show a list of antennas. A window can show the antennas for one radio or for several.

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:

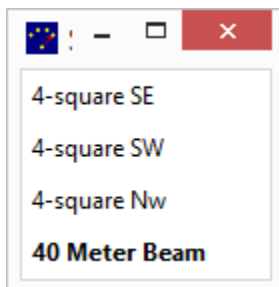


It is possible to place the selected antenna in the center of the list. If this is done the list of antennas is treated like a loop and is rotated until the selected antenna is centered:



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.

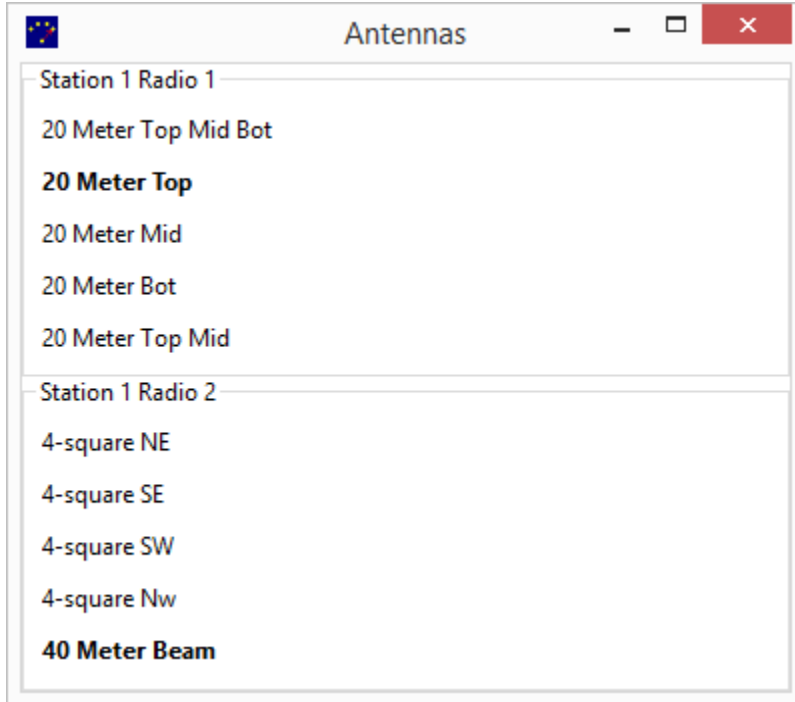
The size and location of the window is remembered so if you stop the client the next time it runs it will put all of the windows where they were previously. The exception is if you reconfigure a window – then it reverts to the default size and position.



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.

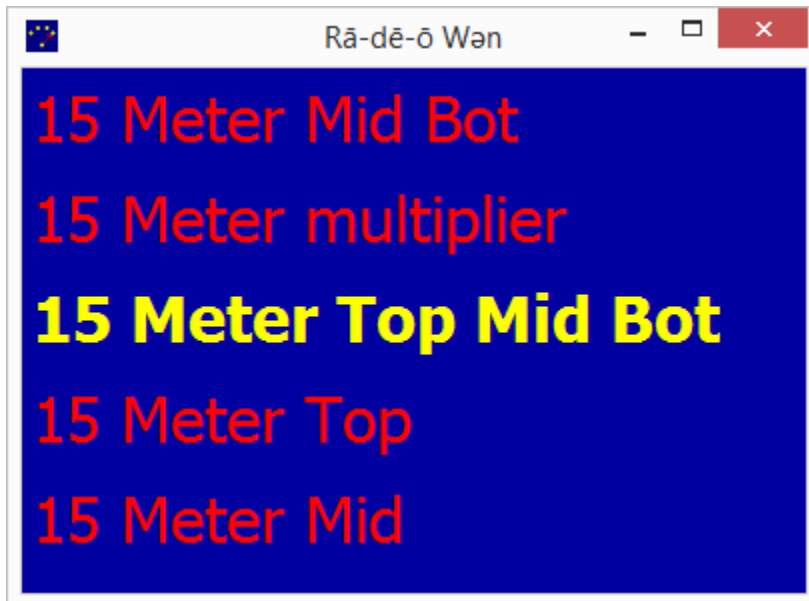
If a radio has more antennas than will fit in the list then the button grid is probably a better choice for selecting antennas.

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. This is the default on a Windows XP system using the same server as was used for the above screens:



2.2. 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.

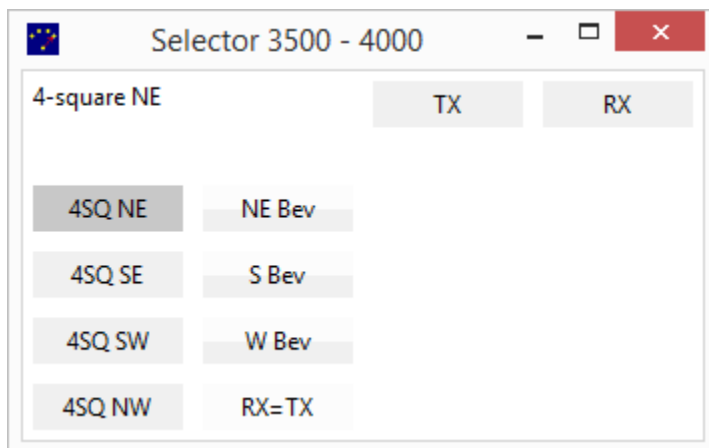
A window shows the antenna choices for one radio. That can be for a specific station and radio or if the window is running on the same PC as the logging program it can be the radio that has focus in the logging program.

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:

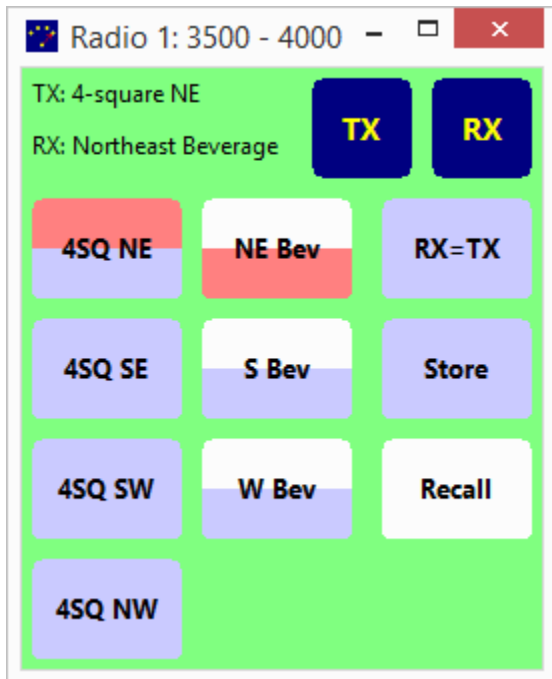


The selected antenna is displayed in the upper left corner. There are TX and RX buttons which are used to change only the transmit or receive antennas. These items can be configured as desired.

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.

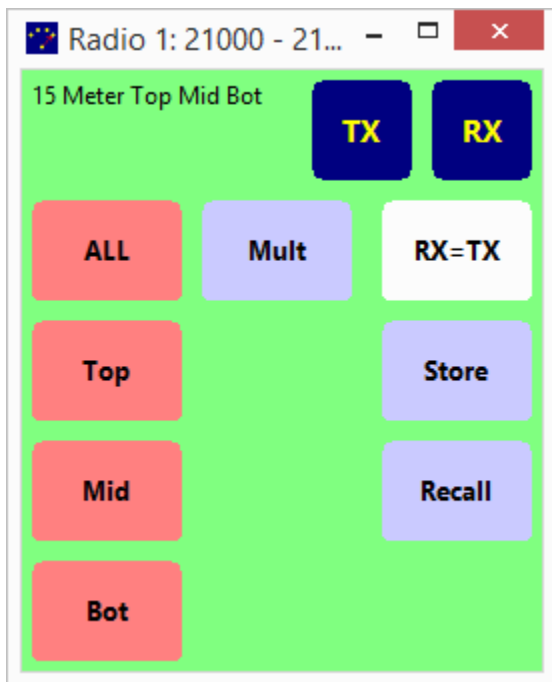


In this case just the top antenna is selected.

Clicking on the Mid button will select that antenna also:

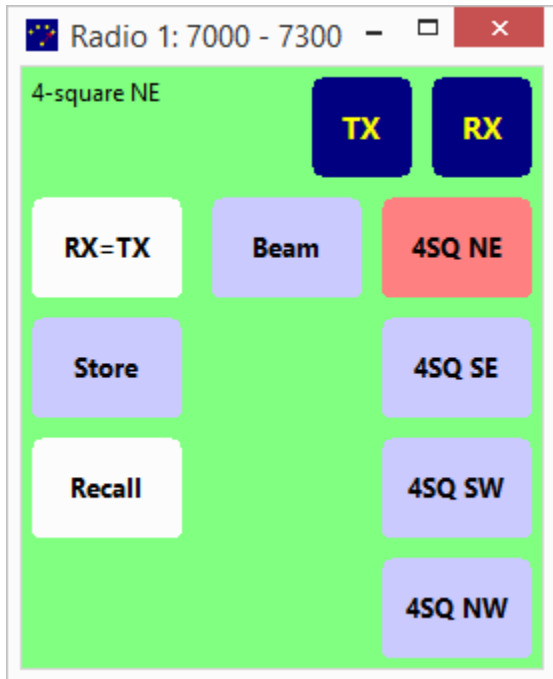


Pressing the ALL button or pressing the Bot button will cause all three antennas to be selected:



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.

This is the default on a Windows XP system using the same server as was used for the above screens:

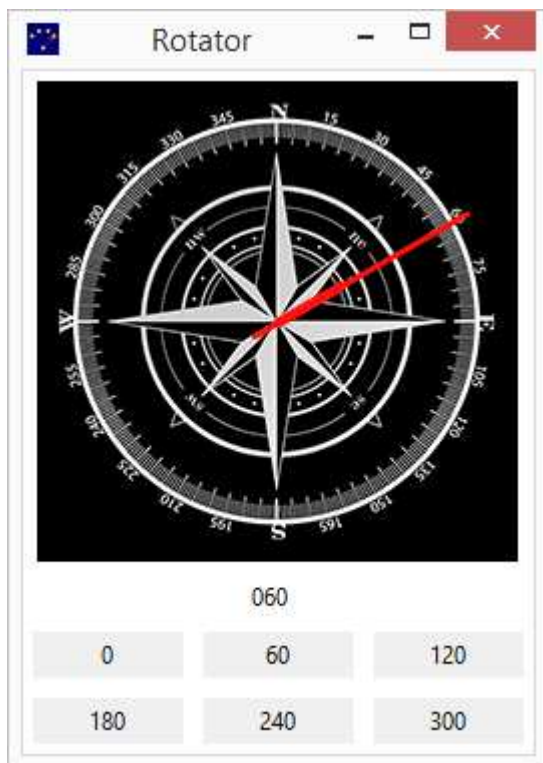


3. Rotator Direction

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:



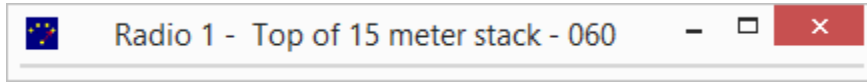
It shows direction both on a compass and numerically. Direction can be changed by clicking on the compass or by clicking on one of the buttons below.

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

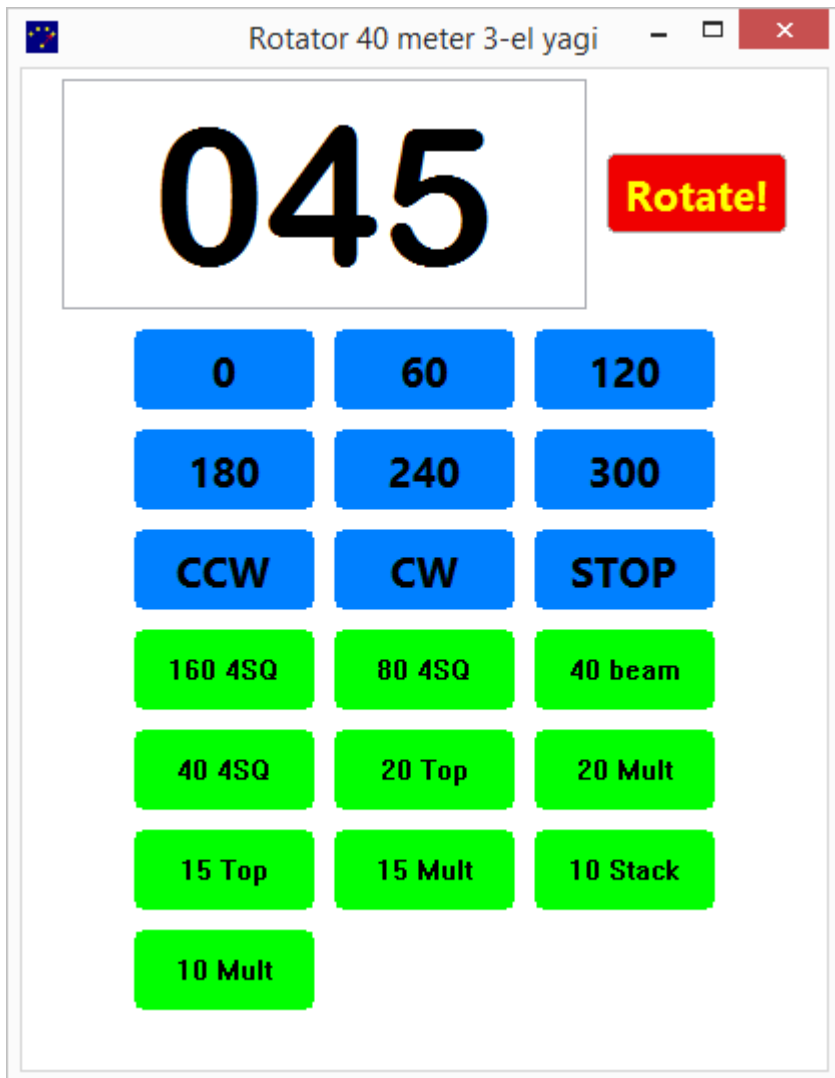
The digital number size, font, and color can be changed. It can also be set to accept input.

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.



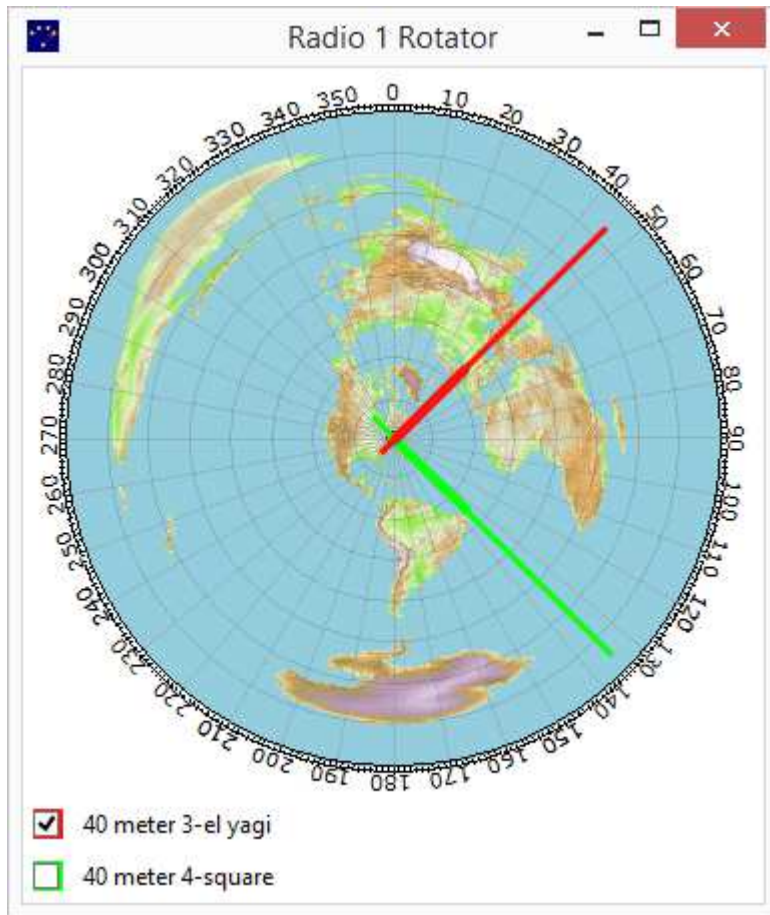
A window can be configured with buttons to select which rotator to turn or display. This window can display or turn any rotator in the station:



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.

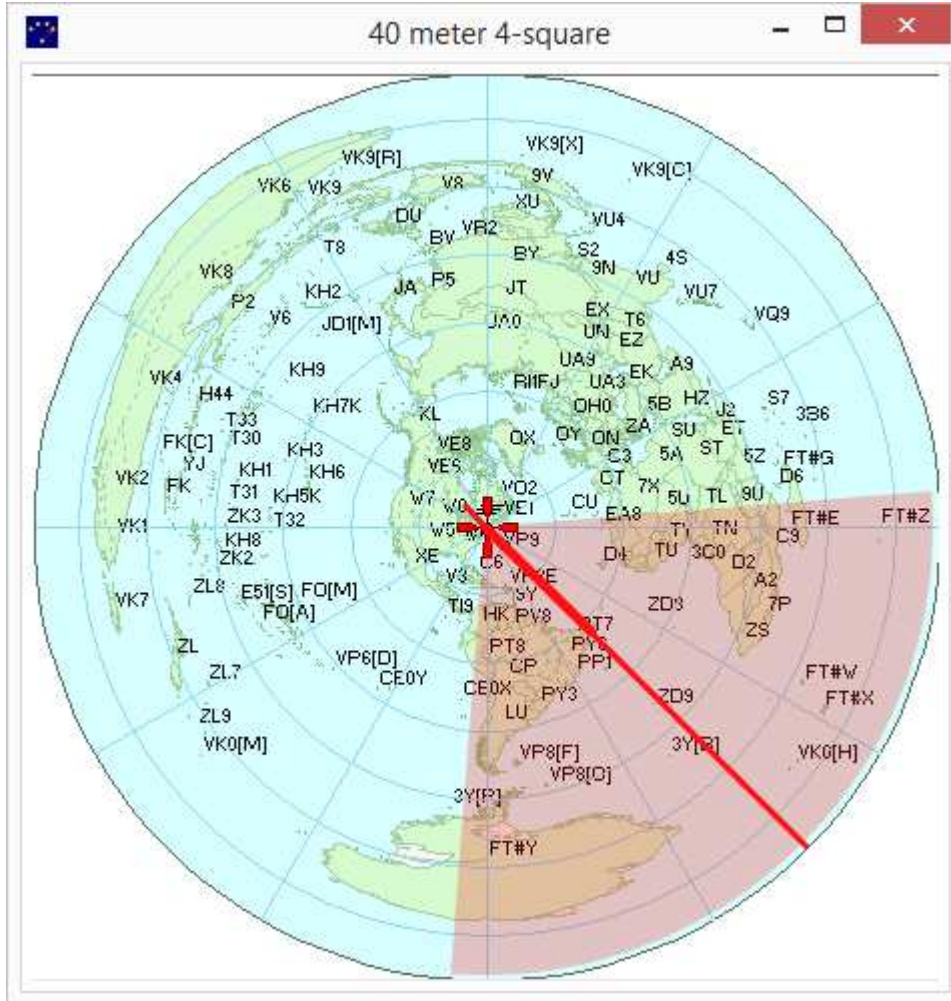
A compass can show more than one rotator:



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.

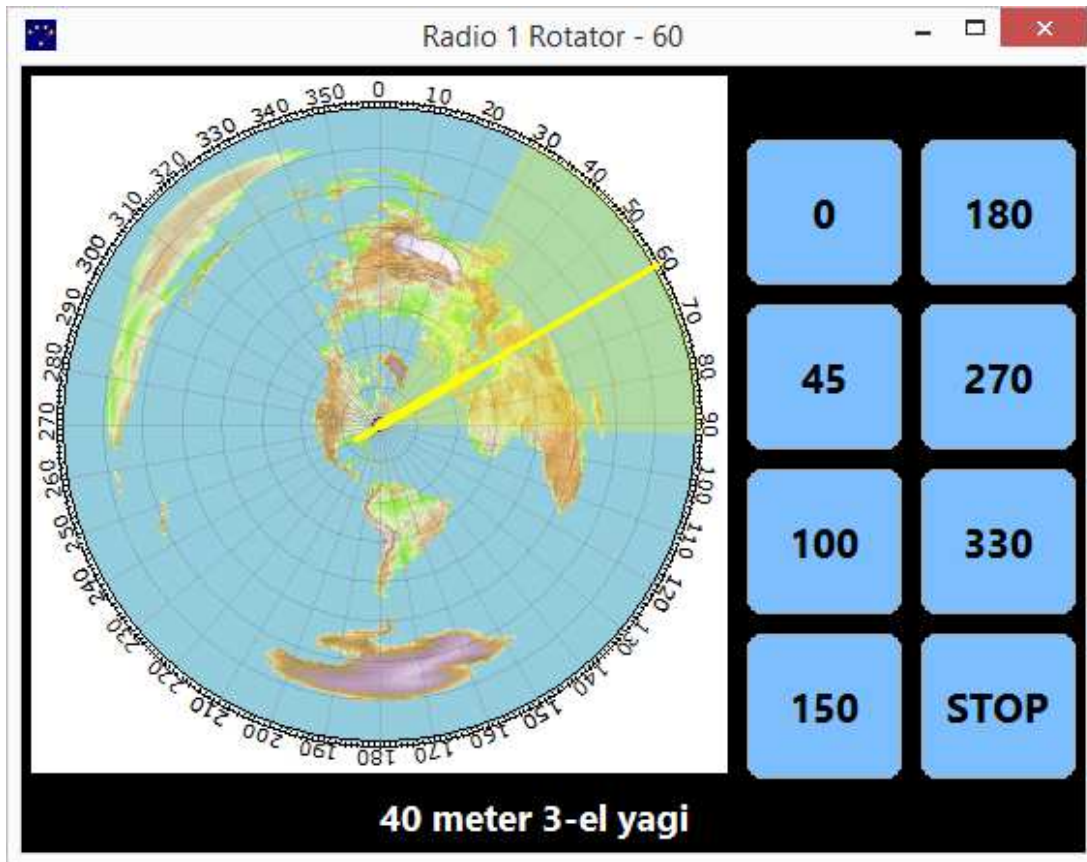
If a rotator is being shown because it turns an antenna then additional informaton is known and can be displayed. The antenna beamwidth, number of lobes, and offset from the rotator can all be shown.

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.

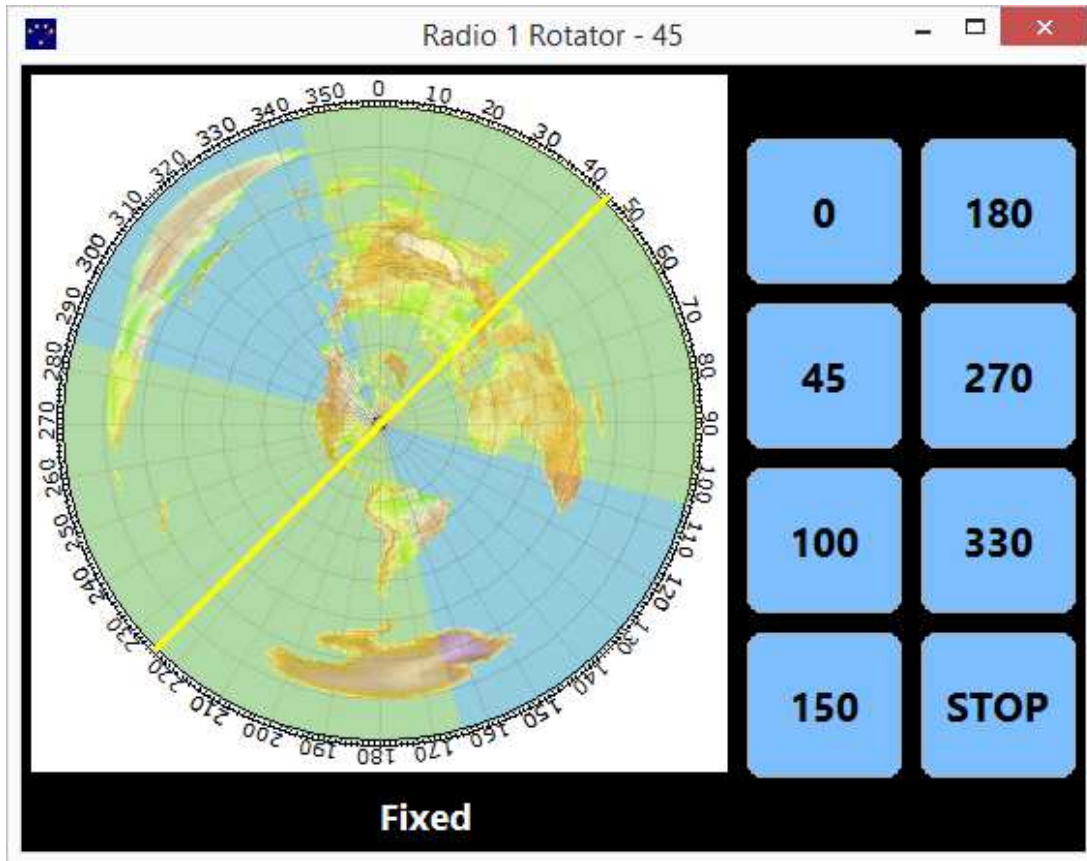
Direction buttons can be placed at the left, right, top, or bottom of the compass:



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.

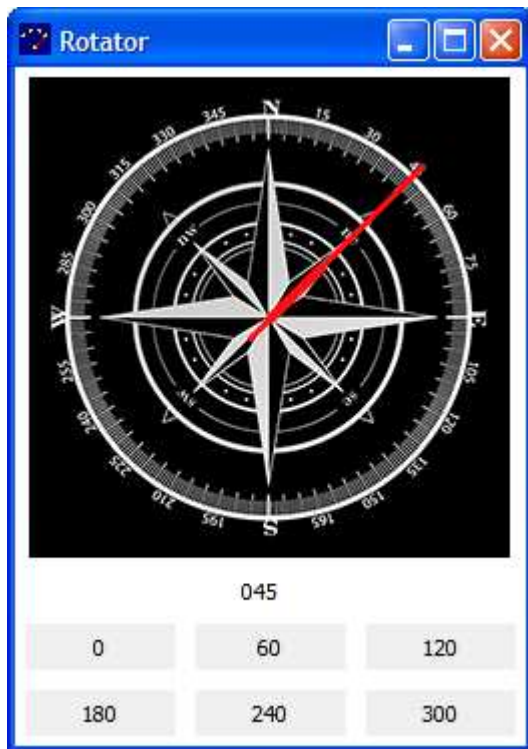
If a no rotatable antennas fit the selection then a fixed antenna can optionally be shown. This is a fixed dipole which is a bidirectional antenna.



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

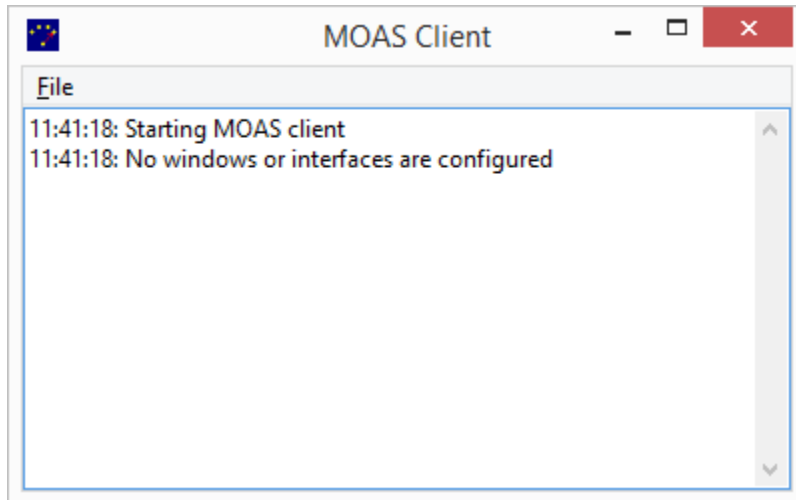
The Rotator Direction window can be run on any PC that can connect to the server. The only restriction is that if it is not on the same PC as the logging program it cannot be set to display the antennas for the radio with logging focus.

This is the default on a Windows XP system using the same server as was used for the above screens:

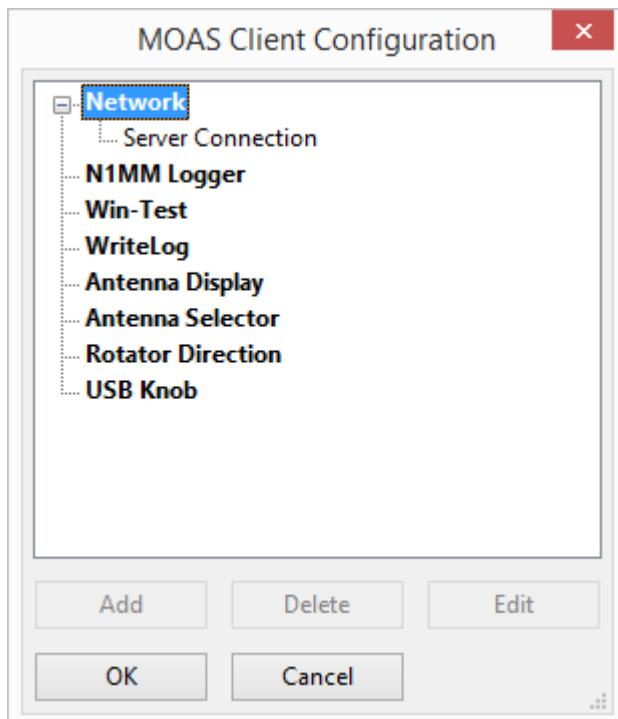


4. Configuration

When the client is initially started after installation it only displays a message window:



Select File -> Configure to display the configuration dialog:



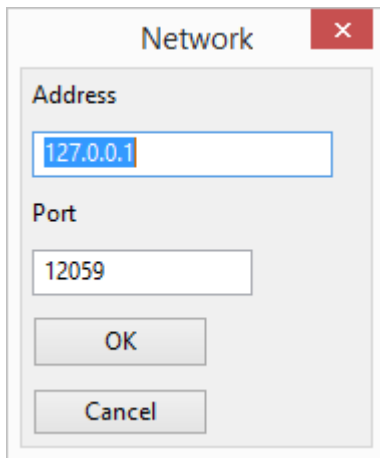
This shows the various things that can be configured. It is not necessary to configure all of them. For example if you might run this on the computer where your logging program is running and configure only a logging program interface.

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.

The USB Knob is not implemented yet and doesn't work.

4.1. 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.

4.2. 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.

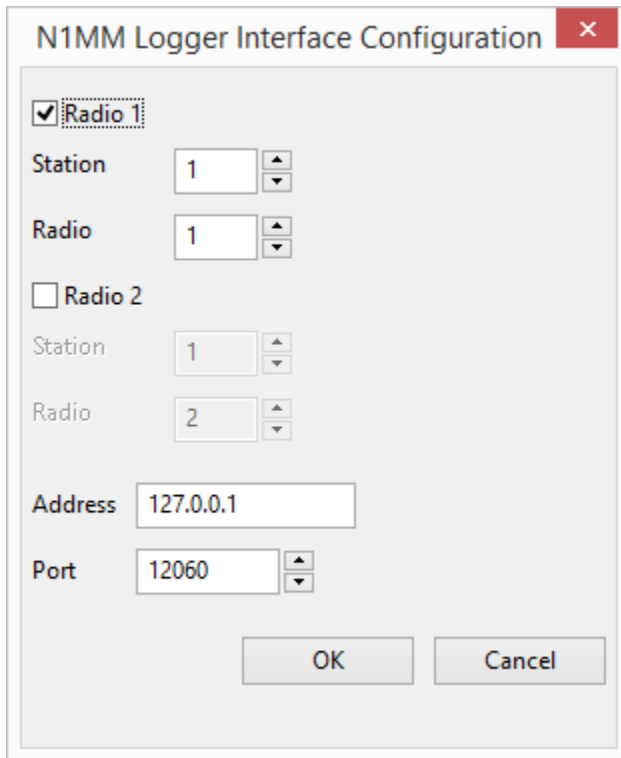
Configuring a logging program interface involves specifying the station and radio numbers to use and providing whatever information is necessary for the MOAS Client to receive information from the logging program. The latter information is different for each logging program.

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.

4.2.1. N1MM Logger Client

The client works with N1MM Logger and with N1MM Logger Plus.

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.



Use only Radio 1 or SO1R or SO1V. Use Radio 2 for SO2R when the logging program is controlling two radios.

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

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

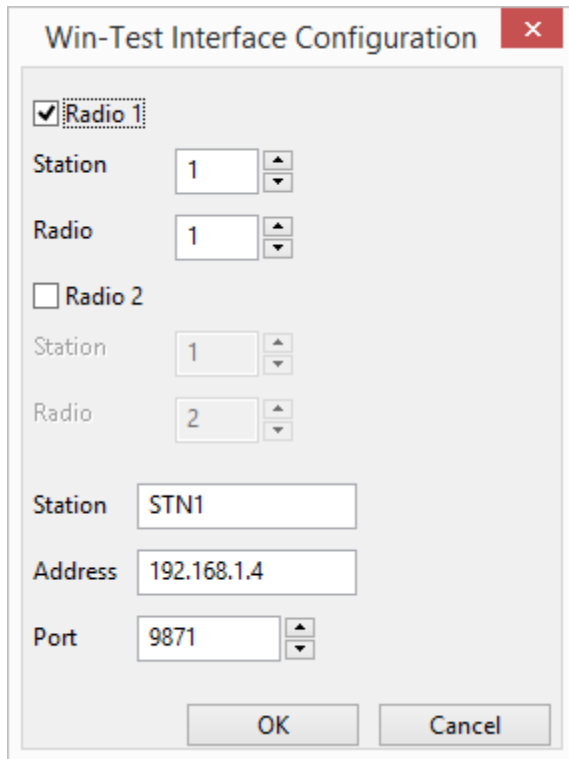
```
[ExternalBroadcast]
DestinationIPs=127.0.0.1
DestinationPort=12060
IsBroadcastRadio=True
```

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.

4.2.2. 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 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.

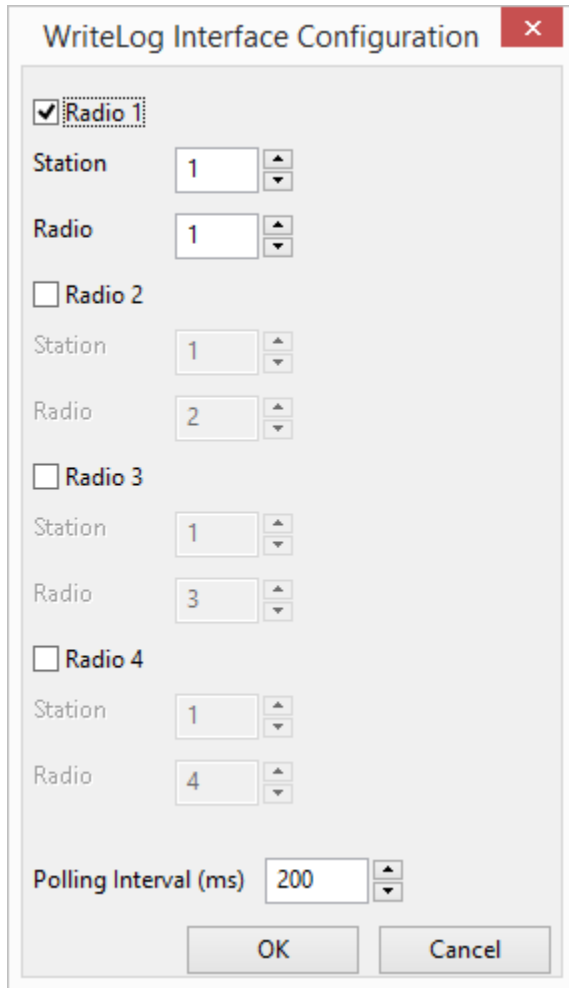
If your computer has virtual networks or multiple active network interfaces then you should pick the network which matches the broadcast address Win-Test shows in the Interfaces Configuration dialog.

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

4.2.3. 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.



The image shows a Windows-style dialog box titled "WriteLog Interface Configuration" with a red close button in the top right corner. The dialog contains four radio button options, each with its own "Station" and "Radio" settings. The "Radio 1" option is selected. Below these are "Polling Interval (ms)" and "OK" and "Cancel" buttons.

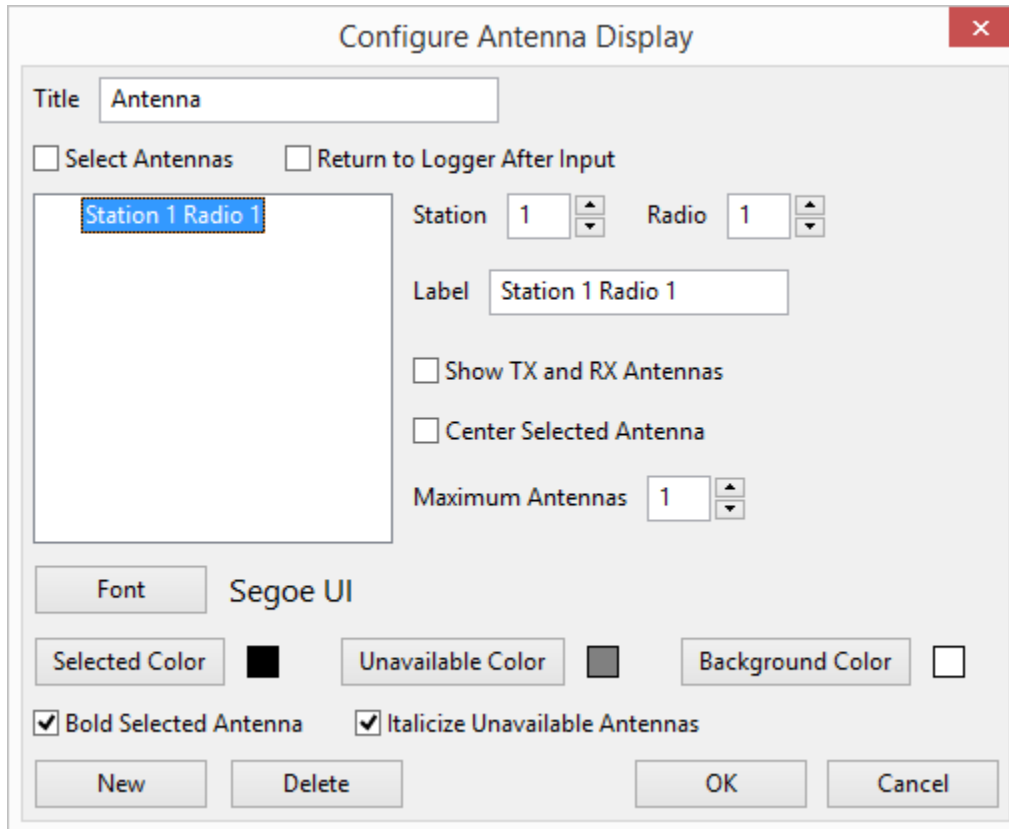
Radio	Station	Radio
<input checked="" type="checkbox"/> Radio 1	1	1
<input type="checkbox"/> Radio 2	1	2
<input type="checkbox"/> Radio 3	1	3
<input type="checkbox"/> Radio 4	1	4

Polling Interval (ms): 200

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.

4.3. 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.

4.4. Antenna Selector

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

The dialog box is titled "Configure Antenna Selector" and contains the following fields and controls:

- Title:** A text box containing "Selector" and a "Background Color" button.
- Show Frequency in Title:** A checked checkbox.
- Show Radio in Title:** An unchecked checkbox.
- Return to Logger After Input:** An unchecked checkbox.
- Selection:** A section containing "Station with Logger Focus" (unchecked checkbox), "Station" (spinner set to 1), and "Radio" (spinner set to 1).
- Display:** A section containing "Show Antenna Name" (checked checkbox), "Show RX Antenna" (checked checkbox), and "Antenna Font" (button showing "Segoe UI").
- Transmit and Recieve Buttons:** A section containing "Show TX and RX Buttons" (checked checkbox) and "Configure TR Buttons" (button).
- Transmit and Receive Labels:** A section containing "TX Label" (text box with "TX") and "RX Label" (text box with "RX").
- Exclusive Selection:** A section containing "Double Click" (checked checkbox) and "Right Click or Touch and Hold" (checked checkbox).
- Selection Buttons:** A section containing "Rows" (spinner set to 4), "Columns" (spinner set to 4), "Configure Buttons" (button), "No Gap" (dropdown), and "Gap After" (spinner set to 1).
- Normal:** A dropdown menu.
- OK** and **Cancel** buttons at the bottom.

Set the **Title** text to the text you want to be shown it 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 diplayed 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.

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

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 additive 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.

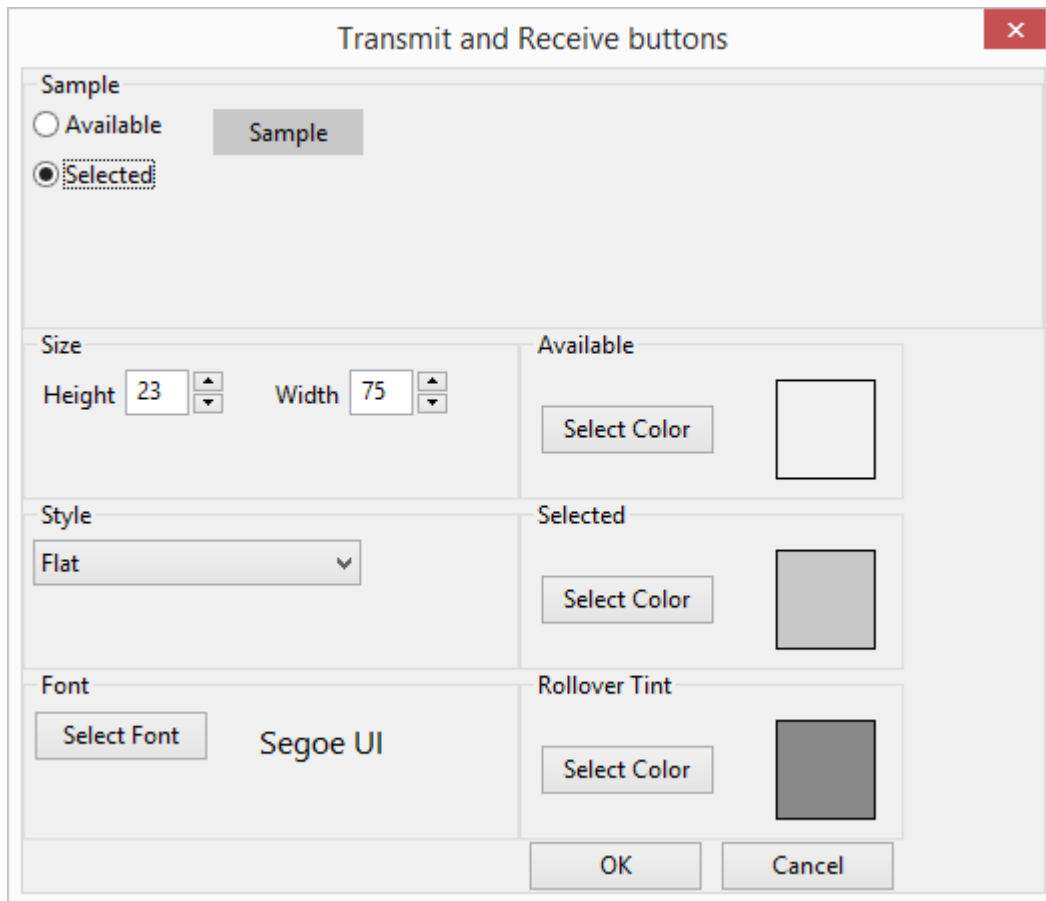
Click **Configure Buttons** to display a dialog where you can set the size, shape, colors, stripes, and font of the buttons. See section 4.4.2 for details.

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.

4.4.1. 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.

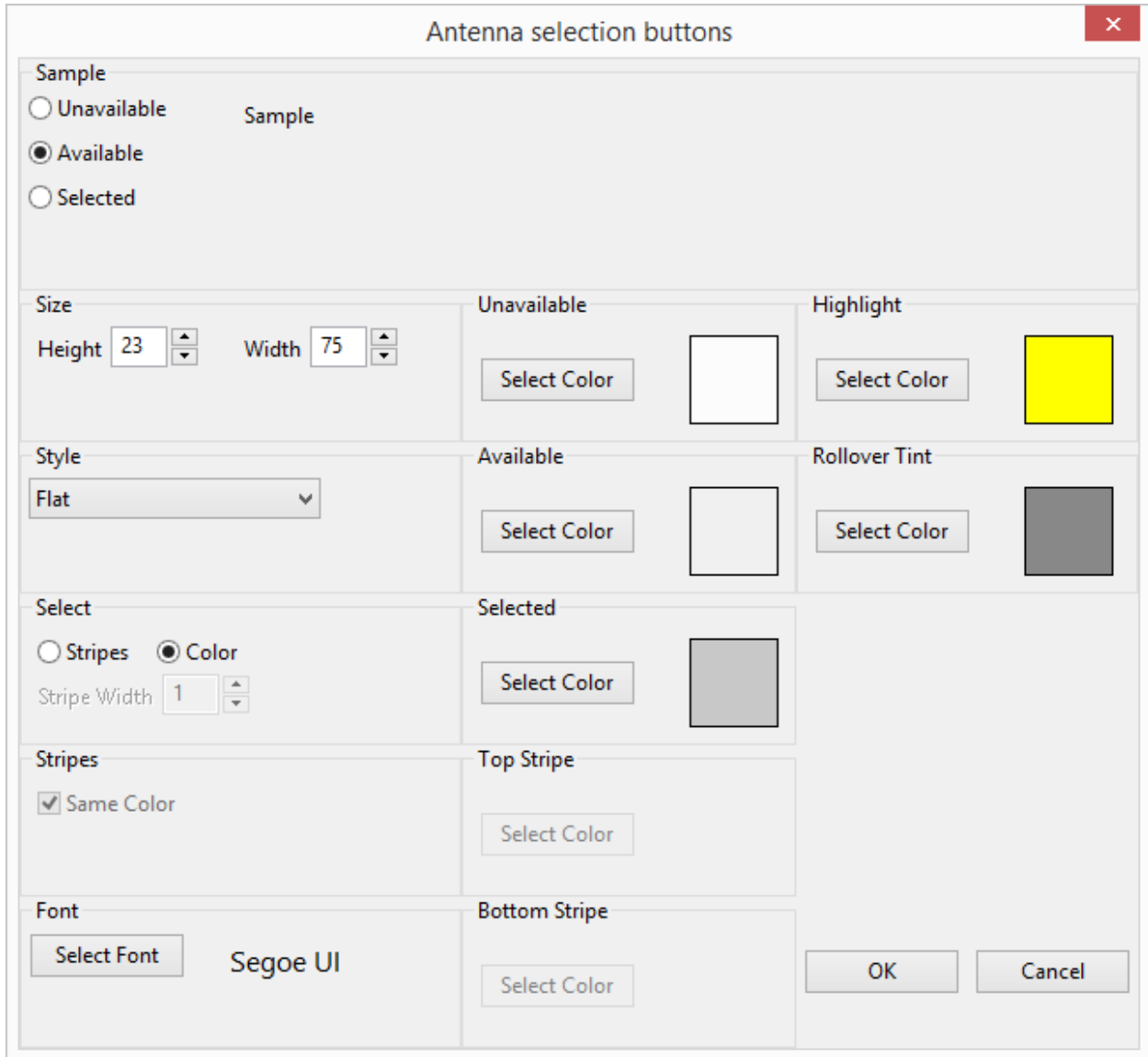
Click the **Select Color** button in the Available box to choose the color the button should show when it has not been clicked.

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.

4.4.2. 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.

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.

4.5. 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 field 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'. Below it are 'Station' (1) and 'Radio' (1) spinners, a 'Name' text field, and a 'Rotator' (1) spinner. There are also 'Buttons' (unchecked), 'Rows' (2), and 'Columns' (3) spinners, a 'Configure Buttons' button, and 'Use Antenna Offset' (unchecked). At the bottom of this section are 'Show Fixed Antennas' (unchecked), 'Fixed' (Fixed), and another 'Fixed' text field.
- Direction Buttons:** A dropdown menu set to 'Bottom', 'Rows' (2), and 'Columns' (3) spinners. A 'Row 1 Column 1' dropdown is set to 'Row 1 Column 1'. Radio buttons are present for 'CCW', 'CW', 'Stop', and 'Heading' (selected). A 'Heading' spinner is set to 0. Below are buttons for 'CCW', 'CW', 'Stop', and 'STOP', along with a 'Configure Buttons' button.
- Compass Display:** A dropdown menu set to 'Medium', 'Allow Input' (checked), and 'Pointer Length' (90) spinner. 'Number of Rotators' (1) spinner and 'Show Rotator Names' (unchecked) checkbox are also present. A 'Font' button shows 'Segoe UI'. 'Show Beamwidth' (unchecked) and 'Show All Lobes' (checked) checkboxes are included. A 'File' text field and 'Browse' button are at the bottom of this section. Four pointer color selection buttons are shown: 'Pointer 1' (red), 'Pointer 2' (green), 'Pointer 3' (blue), and 'Pointer 4' (yellow).
- Digital Display:** 'Show Degrees' (checked) and 'Allow Input' (unchecked) checkboxes. A 'Configure Button' button and 'Button Text' (Rotate) text field are present. A 'Font' button shows 'Segoe UI'.

At the bottom right of the dialog are 'OK' and 'Cancel' buttons.

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:

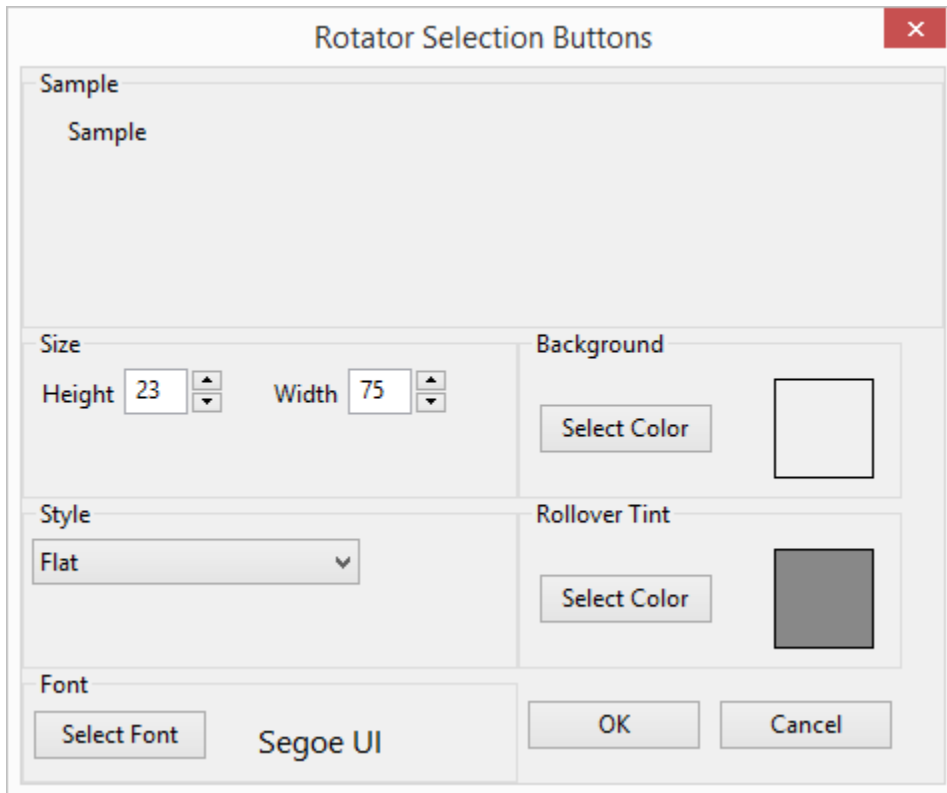
Check the **Show Degrees** box.

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.

4.5.1. 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.

4.6. USB Knob

The USB Knob is not implemented yet. If you try to select it you will get an error.