Hi-Z Antennas™

Receiving Array Controller
With an OLED Display

Modern Directional control for ALL Hi-Z Antennas Receiving Arrays

Direction Control Utilizing a Fully Continuous Rotation Rotary Encoder

Crystal Clear Readout Using a High Contrast OLED Display

Flip function for direct "front to back" selection and Auto Rotate for automatic continuous direction change

Part Number HIZ-SS2

Hi-Z Receiving Array Shack Switch Using an OLED Display

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1. Introduction

Thank you for selecting the Hi-Z Shack Switch-2 system. The Hi-Z part number “HIZ-SS2” represents our continuing use of technology. This controller is built specifically for controlling your Hi-Z Antenna Receiving Array. You can use this controller stand alone with any Hi-Z receiving array. At the heart of the controller is a microprocessor, a graphical display, and a control knob. The control knob is used to command the antenna array to select an azimuth direction, configuration, diagnostics, and enabling special features. The controller has a graphical display that shows the selected azimuth direction and additional user configurable information. A USB interface is used as power for the controllers display and processor. Hi-Z has designed this product to be powered from any USB computer port or USB charger wall plug or battery. This product is designed to be used to replace the standard Shack Switch supplied with the receiving arrays. This product is expected to supplant the older switches in time.
You may E-mail contact@hizantennas.com for the latest information we may have.

2. Jumpstart, or “Real Hams Don’t read manuals”

What’s in the box: Controller with display, knob, a terminal strip on the rear, a rear Mini B USB input connector, and a copy of this manual.

You may; as a quick way to try this controller, simply supply it with power from a Cell phone charger or cell phone backup battery or any wall type USB supply. The cable to use is a USB A to USB Mini B cable. This cable is typical of the ones used in many aftermarket devices.

Assuming you have powered the controller in a few seconds you should see an initial screen saying Hi-Z Shack Switch 2 and the software version presently installed. After a brief moment of this the display will switch to our pre-programmed setting for a Hi-Z 4-8 Pro array. Notice as you rotate the knob the direction indication will change through all 8 of the directions available with the 4-8 Pro array. If you are watching the display for 15 minutes without making any selection the display will be reduced to a single dot that jumps around the screen like a screen saver. Turning the direction control will restore the screen to normal.

Press in on the direction knob and you will see the screen change to a set of directories like “Set Antenna Type” or “Dir or Angle” and more. These directories are for setting up the controller for all of its programmable functions. For the moment select “Set Antenna Type” by rotating the direction knob. Depress the knob again and as initialized by Hi-Z you will see “4-8Pro”. Rotate the knob and you will see the Hi-Z preprogrammed names of all the current Hi-Z arrays. You can select your array type now or leave it at the “4-8 Pro” setting. You select your array by depressing the button again after you have rotated the knob to your array type. The screen will then go back to the normal direction control display. The display will also time out and go back on its own from the programming directories if you wait too long to depress or select anything. Disconnect the USB power after the initial indoctrination of the controls.

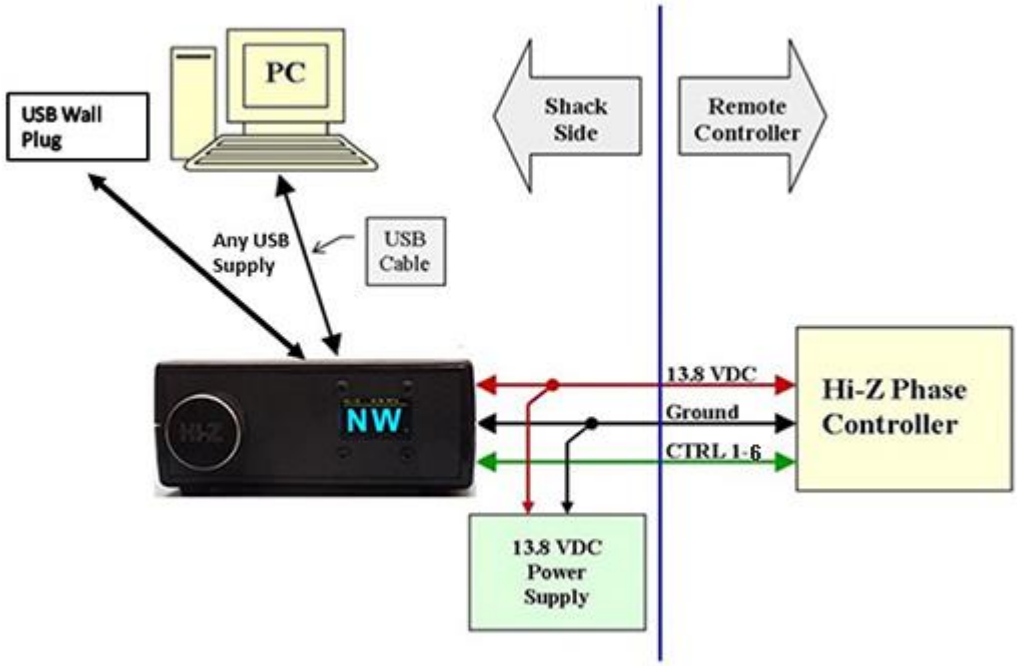
Besides the 5 Volts the controller gets from the USB power, you will need to supply 11 to 14 Volts DC from your shack supply or the same supply that runs the Hi-Z Array. This supply’s minus or ground must be connected to the array ground. Either its feedline ground or a separate ground leading to the array. This is necessary because the HIZ-SS2 shack switch has an optically isolated division between its internal

processor and the cables to the Hi-Z array that extends into the antenna field for electrical event protection. Induced currents in the control lines are kept from the actual switching circuitry through that optical isolation.

The use of 2 supply voltages is for a very good reason. The switching output is optically coupled from the processor. This protects the digital circuitry from some lightning static and induced currents. It also keeps any processor noise from feeding back into the sensitive Hi-Z array being controlled.

3. Connecting the Wires

The rear connector is labeled so that you can easily connect the 12 Volt supply and ground as well as the necessary and the CTRL lines needed by the array. The controller's connector is numbered exactly as the Hi-Z array CTRL lines are numbered so they can easily be transferred from a shack switch retrofit or new array install. Consult the Hi-Z array manual for CTRL wiring. Terminal 6 is for the Auxiliary switch turned on and off via the menu.



Assuming you are ready to install the SS2, go ahead and connect the 12 Volt supply at this time and also the CTRL lines coming from the array. Connect the USB power and watch the new controller initialize and become active for direction control. If you did not select your intended array to control in the previous steps, depress the direction control knob and select your array now using the previous description or the description below for the programming directions that ends with a knob depress. You should be able to control your array's direction easily at this point using the direction control knob.

4. Programming

All basic programming of the HIZ-SS2 begins with a push of the direction control knob and ends with the same push after making a selection. All the programming functions below assume the SS2 has been powered up either by a USB supply or a computer. All programming will remain in effect when the controller is powered off and it will return when the power is restored.

Here is an example using the Hi-Z Knob for a programming sequence.

Direction Screen | Set Antenna Screen | Set Antenna Screen | Back to Direction Screen

4.1. Set Antenna Type

First, push the Hi-Z knob which brings up the directories of all the programming functions. Rotate the Hi-Z knob until "Set Antenna Type" is viewed on the screen. Depress the Hi-Z knob again and you will see one of the Hi-Z arrays description displayed. Rotate the knob until you see the correct array you are programming the controller for. Depress the knob again and the array will be set into memory and the

screen returns to the normal direction readout screen. Check the upper right corner of the screen where you will see the selected array type if array type is selected.

4.2. Dir or Angle

The direction readout on the screen can be set for compass directions such as N,NE,S,and SE etc. or in degrees such a 0, 90,135, or 270 etc. The available directions or angles will depend on the Hi-Z array's available angles. This controller is shipped pre-programmed for compass directions and to change it, again a knob depress and rotate the knob until you see "Dir or Angle". Depressing the knob again brings up the current setting and rotating the knob allows you to set Direction or Angle. After this selection a knob press takes you back to the normal direction readout screen.

4.3. Set Offset

If you have installed your Hi-Z array off axis of a normal compass heading such as North, Northeast, 90 Degrees etc. you can offset the controller to match your offset. To enter this mode push the knob and rotate it until you see "Set Offset". Pressing the knob again you will see "-Value and below it a number. The number is the value of the offset in degrees. You can adjust this positive by clockwise direction or negative in the counter clockwise direction. Set in your number of degrees offset and again push the knob to return to the normal direction readout screen. It is possible to display the actual array angle due to offset by referring to the "Display Top function below and setting it to actual position. When using Angle as a main readout the display will show the actual angle the array is receiving from the same as the display top function.

4.4. Enable Aux

The "Enable Aux" function is provided to activate one extra auxiliary switch (#6) output manually. Again to enable this function, press the Hi-Z knob and rotate it until the "Enable Aux" function is displayed. Press the knob again and the display will show if the function is enabled or disabled. Rotating the knob allows the user to select enabled or disabled. Pushing the knob will return to the direction screen. There is a little

dot in the bottom right corner of the display that lights when the Aux function is enabled as shown on page 4 of this document.

4.5. Display Top

The “Display Top” function allows the user to select what information is displayed at the top right corner of the Yellow part of the display. One selection is “Ant Type” and is to display the array type selected by the operator. The second function “Act Pos” and is to display the actual array direction in Degrees when an array is physically mounted offset from usual compass directions and the offset function is used. The third function “Req Pos” is to display the requested position which will read the compass direction in Degrees. Another function is “Relay” which will display the actual on or off condition for whatever direction is selected of all the switched outputs used for the Antenna type selected. The last function is “None” which leaves that top right corner blank.

4.6. Display Off

The “Display Off” function allows the user to set the time that the screen saver will take before turning the display to a dim single dot jumping around the screen. The time can be set for many values between 15 minutes and three hours. It can even be disabled by this function. These organic screens are new technology and their lifetime may be affected by long term high brightness use. Especially if the Brightness is set to higher than a 3 level. To be on the safe side we have included the screen saver function. To select the time of the screen saver time out or to disable it depress the Hi-Z knob and rotate it until you see the “Display Off” function. Depress the knob again and the current value of time will be displayed. Rotating the knob will then bring up all the values available including the “Disabled” one. Select the value you want and depress the knob again and you will be back to the Direction readout screen.

4.7. Display Brightness

The “Display Brightness” function does exactly what it says. There are 5 values of brightness available with the factory default value being BI=2. To access the “Display Brightness” function depress the Hi-Z knob and rotate the knob until you see “Display Brightness”. Depress the knob again and the screen will change to where you can see “BI” and a ”BV” values. Rotate the knob to change between the 5 BI values available. This is no place for “All Knobs To The Right”. The factory default is BI=2 and in normal room light the display is quite readable. Again, these OLED displays are new and the lifetime is unknown so be gentle with your selection of BI value. Depress the knob and you will return to the normal Direction display screen.

4.8. Rly Test, Walking 1s

The “Rly Test Walking 1’s” function is a diagnostic test mode that allows a user to verify switched outputs quickly. This function allows all 6 of the switched outputs to be switched to ground in a sequential manner. The outputs will switch for a 1 second period then advance to the next higher output connector number. It will continue to switch through this sequence until stopped. To enable this function depress the Hi-Z knob and then rotate it until the “Rly Test Walking 1s” function is displayed. Depressing the knob again will start the function. Depressing it again will terminate the test.

4.9. Rly Test, Val

This function is a quick way to activate any one of the 6 switches at the output connector. As you rotate the Hi-Z knob when this function is enabled the unit will switch any of the available outputs to an on state for testing purposes. To select this function, depress the Hi-Z knob and rotate it until the “Rly Test, Val” function shows. Depress the knob again and then when you rotate the knob you can select any individual output switch to an on state. Depressing the knob again disables this function and returns you to the direction readout screen. This is a way to test or activate the unused outputs depending on the array you have chosen.

4.10. Display Volts

This function allows the user to measure the voltage supplied by the USB power source. It allows you to make sure the source and the cable in use is supplying the proper 5 Volts as it should. To select this function depress the Hi-Z knob and rotate it until you see “Display Volts”. Press the knob again and the unit will show the actual voltage being supplied by the power source and cable. Depressing the knob again disables this function and returns the unit to the direction display screen. The voltage reading should be between 4.50 and 5.25 Volts DC. Values lower than this may be an indication of a bad USB cable and normal operation may be negatively affected.

4.11 Enable Flip

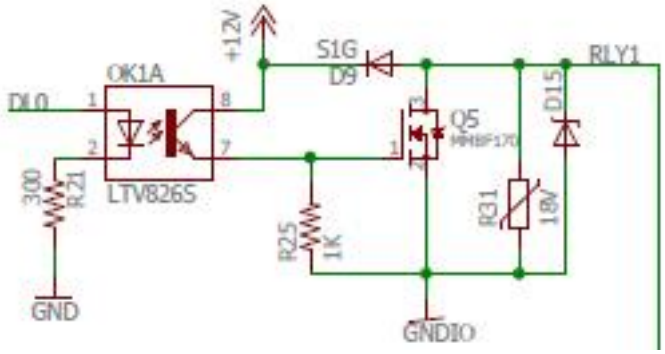
The “Enable Flip” function allows the operator to select the opposite 180 degree direction of an array to be selected with a simple depression of the Hi-Z knob. The knob can be repeatedly pressed after the function is enabled to flip back and forth between two 180 degree different directions until this function is disabled. To enable this function depress the Hi-Z knob while in the normal direction readout screen which will bring up the function directories again. Rotate the direction knob until “Enable Flip” is displayed. Press the knob again and you will see the current state of the function. Rotate the knob until you see the Enable the flip function. Depress the knob again and you will be returned to the normal direction readout screen. Now you can repeatedly press the knob causing the array to shift between two 180 degree different directions. You can still rotate the direction control and flip between two different 180 degree flip directions. To stop this function depress the Hi-Z knob for 3 seconds. When you let the knob up it will return the controller to the Direction screen.

4.12 Auto Rotate

The “Auto Rotate” function allows this controller to continuously step to each available direction automatically. It can rotate “CW” for clockwise with the array viewed from above or “CCW” for counterclockwise viewed from the top. Again to enable this function, press the Hi-Z knob and rotate it until the “Auto Rotate” function is displayed. Press the knob again and rotate the knob for three choices “CW”, “CCW”, or ”Stop”. Select the direction you want and again press the knob and you will return to the Direction display screen with “Auto Rotate” enabled. The controller will continue to step

through each direction available with the array selection until the Hi-Z knob is pushed again. One simple knob press returns you to the direction screen when using “Auto Rotate”.

5. Typical Output Switch Connections



out

RLY1 in the above schematic is showing the typical output connection used to switch the CTRL lines for any Hi-Z Receiving array. Each line is optically isolated and fully protected from over voltage, reverse voltage, and voltage transients. Caution should be exercised to make sure any of these Switch Output lines are not connected directly to a power supply voltage as the outputs are rated only for 200ma. DC. Hi-Z arrays are typically using 40ma. DC Maximum switching current. It would be prudent to check the current coming out of each CTRL line of the Hi-Z array before connection to the SS2. A simple current meter connected between the Hi-Z array Ground and any of the CTRL lines coming from the array should show the amount of current being switched.

NOTES

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Thank You for selecting Hi-Z Antennas Products.
Find more information at www.hizantennas.com
Our products are handled exclusively through DX Engineering
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