



HIGH PERFORMANCE HF RECEIVING SYSTEMS & COMPONENTS

Hi-Z Array Steering System Models

Hi-Z 4ASC (4 verticals)

Hi-Z 8ASC (8 verticals)



Typical Hi-Z ASC 4 – Two Hi-Z 4 s – One set of 4 Verticals

Congratulations and Thank You for the purchase of our system. *We recommend that you read this manual and fully understand the requirements for the proper installation of your system. This manual covers the installation of both systems and is masked accordingly.*

Specifications

- 4 verticals to two Hi-Z 4 Systems OR
- 8 verticals to two Hi-Z 8A or Hi-Z 4-8PRO Systems (useable on 40 meters, not recommended)
- Output level attenuation from Array Steering Controller -3db
- Power Requirements 13.8 VDC

Features:

- Use existing vertical system
- Simple cabling
- Maximizes utility of Hi-Z 4, Hi-Z 4-8PRO and Hi-Z 8A systems

Benefits:

- Maximize utility and station configurations in Contesting environments.
- Use currently installed vertical array system
- Two Receivers with totally independent control (band and direction independence)
- Each Receiver has complete direction control (one RX could be at NE, second RX pointed South)
- In the case of the Hi-Z 4 – while having concurrent direction control, will also have independent band (160-40 meters) control and usage (one RX could be pointed NE on 40 and the second RX could be pointed SE on 160 concurrently.)

Component List for the Hi-Z Array Steering System by Hi-Z Model:

Hi-Z 4 ASC (assumes previously installer Hi-Z 4)

- 1- Hi-Z 4 ASC
- 1 – Hi-Z 4 Phase controller
- 2 – Delay cables (LONG, SHORT)
- 1 – Hi-Z 4 Shack Switch
- 1 – Hi-Z 75Ω In-Line Pre-amp
- 1 – Hi-Z 75Ω to 50Ω Transformer
- 5 – 3 foot long RG6 cables
- 5 – 3 foot long wire with terminals (power to Inline pre-amp, 2nd controller, Hi-Z 4ASC)

Hi-Z 8A ASC and Hi-Z 4-8PRO (assumes previously installed Hi-Z 8A or Hi-Z 4-8PRO)

- 2- Hi-Z 4 ASC
- 1 – Hi-Z 8 Phase controller or 4-8PRO (Hi-Z 4 + PnP controllers)
- 2 – Delay cables (LONG, SHORT)
- 1 – Hi-Z 8 Shack Switch
- 1 – Hi-Z 75Ω In-Line Pre-amp
- 1 – Hi-Z 75Ω to 50Ω Transformer
- 9 – 3 foot long RG6 cables
- 7 – 3 foot long wires with terminals (power to Inline pre-amp, 2nd controller, 2 ea Hi-Z 4ASC)

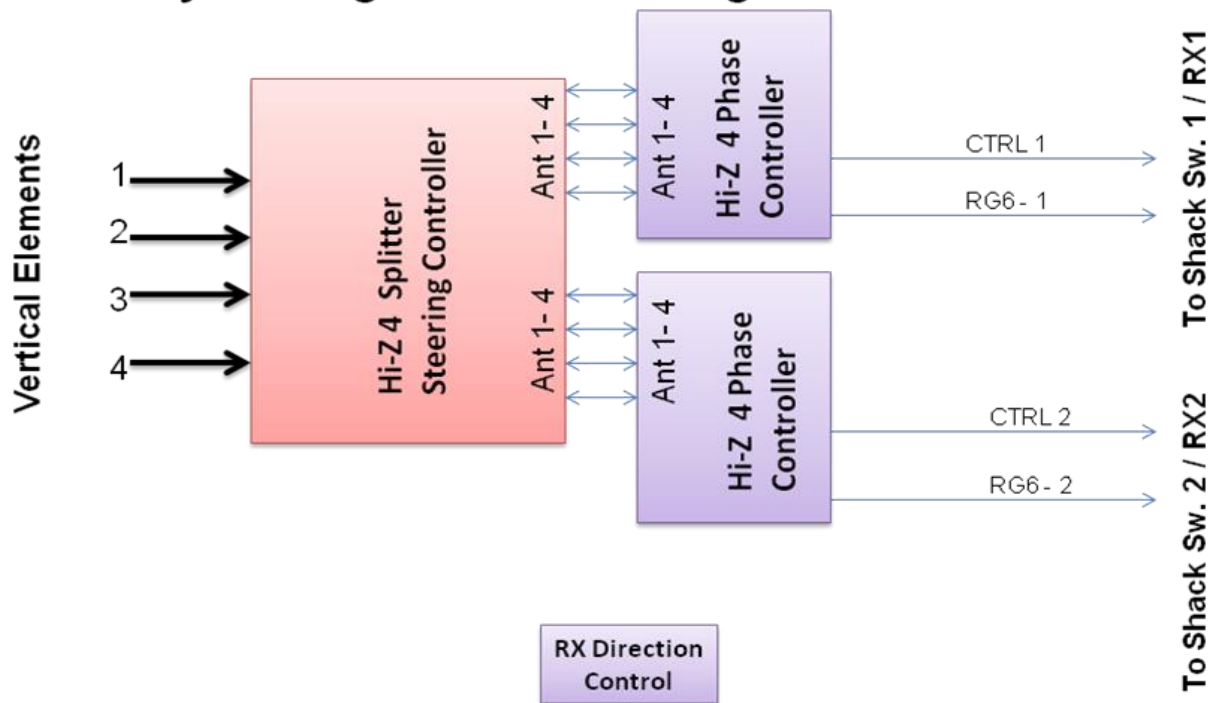
Material That the Customer Supplies -

1. Second control cable run for additional Hi-Z 4phase controller. (CNTL1, CNTL2) **FOR Hi-Z 4 ASC ONLY OR**
2. Second control cable run for additional Hi-Z 8 phase controller. (CNTL1, CNTL2, CNTL3, CNTL4, CTRL5) **FOR Hi-Z 8 ASC ONLY**

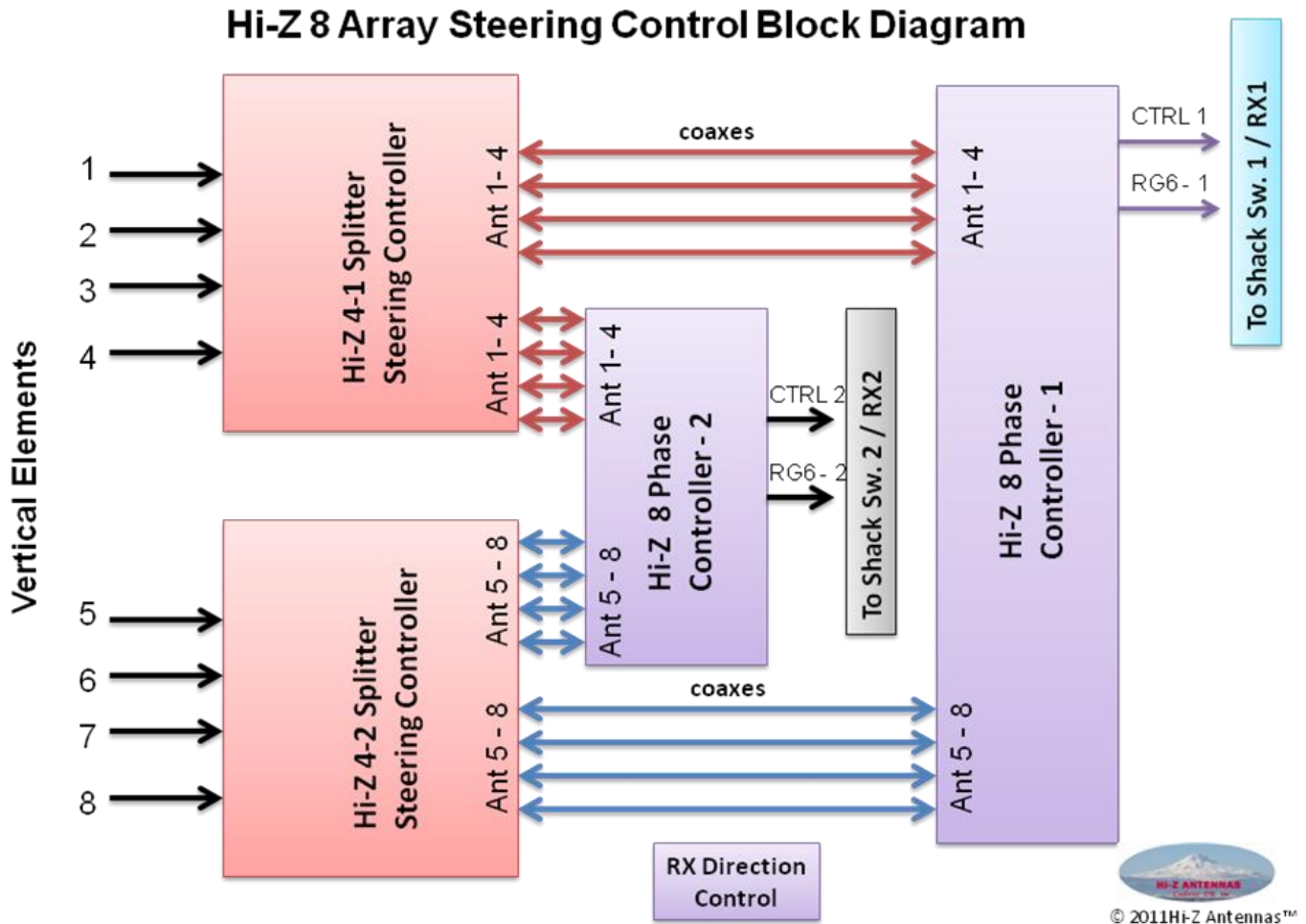
3. Second control cable run for additional Hi-Z 4-8PRO controller. (CNTL1, CNTL2, CNTL3) **FOR Hi-Z 4-8PRO ONLY**
4. Second RG6 coax and connectors (connecting second phase controller /second in-line pre-amp) to shack receiver location. RG6 coax is more than adequate to lengths out to 1000 feet long.
5. **Weatherproofing the electronics.** You will need an adequate cover or enclosure that will keep rain and snow off the phase controller, in-line pre-amp and filters if installed, and the Hi-Z Amps at the base of each vertical. Water getting inside of these enclosures WILL cause DAMAGE.

The following Block Diagrams are visual aid for the wiring and cabling required to install the Hi-Z 4 ASC System.

Hi-Z 4 Array Steering Control Block Diagram



The following Block Diagram is a visual aid for the wiring and cabling required to install the Hi-Z 8 ASC Systems.



In this block diagram, the Hi-Z ASC System uses:

- **Hi-Z 4** – one Steering Controller, one additional Hi-Z 4 phase controller, one additional shack switch
- **Hi-Z 4-8PRO** – same as Hi-Z 4 plus an additional Steering Controller, one additional shack switch
- **Hi-Z 8A** – same as Hi-Z 4 plus additional Steering Controller

| SYSTEM | Hi-Z ASC | Hi-Z Shack Switches Total | Directions |
|-----------------|----------|---------------------------|------------|
| 2 X Hi-Z 4 | 1 | 2 | 4 |
| 2 X Hi-Z 8A | 2 | 2 | 8 |
| 2 X Hi-Z 4-8PRO | 2 | 2 | 8 |

OPTIONS

Filters for site specific issues, for example local and or high power AM broadcast stations. Hi-Z Antennas™ makes a BPF look at http://www.hizantennas.com/band_pass.htm and a HPF look at http://www.hizantennas.com/high_pass.htm

SITE PREPARATION

Control Cable and Coax Considerations

1. Recommended RG6 F connector tightening process. See appendix A.
2. Conductor wire gauge selection is a function of the length of the control cable. 18 gauge wires are adequate out to 500 feet. Any longer will need to increase wire gauge size to accommodate the voltage drop over the run of cable length. An inexpensive source of cable is from Lowes, Home Depot, etc in their electrical department. They have 5, 7, 9 conductor, 18 gauge direct burial sprinkler control cable. Usually they will have it on large spools and can be cut to the length you require. Always get extra.
3. Make sure that the RG6 connectors are tight and of good quality.
4. If you crimp on terminals on the control cable, go the extra step and solder each terminal for reliability.
5. The Hi-Z ASC enclosures will likely be in very close proximity to the existing phase controllers.
6. **Disconnect ALL verticals from the current installed phase controllers. Later is the manual and based on which system you are installing, instructions will indicate the where to re-connect the existing vertical coaxes.**

PICTURES HERE

Connections for the Hi-4 ASC ONLY

You will be making the same connections to the second Hi-Z 4 phase controller as implemented in the first install.

Disconnect the 4 vertical coaxes (Ant1, ANT2, Ant3, and Ant4) from the current Hi-Z 4 phase controller. **The coaxes will be reconnected last as per the chart below.**

Wiring:

Jumper power wires (13.8VDC, GND) to the 2nd Hi-Z phase controller AND to the Hi-Z 4 ASC from current phase controller. Also use jumper wire to connect 13.8VDC to the Hi-Z 75Ω In-line Pre-amp. For the Hi-Z 4 - Connect CTRL1 and CTRL2 on the NEW phase controller to NEW shack switch.

Chart - Wiring Connections (Conn = connection(s))

| Wiring Connect TO | 13.8VDC | GND | CTRL1 | CTRL2 |
|-----------------------------------|---------|--------|---------------------|-------------------|
| Hi-Z 4 phase controller (2each) | 2 conn | 2 conn | 1 conn / controller | 1 conn/controller |
| Hi-Z ASC | 1 conn | 1 conn | | |
| Hi-Z 75Ω In-line Pre-amp (2 each) | 2 conn | 2 conn | | |

Connect the 3 foot RG6 cables (8 each) as follows: HINT: Make another copy of this chart as a check off list while making these connections.

| Hi-Z 4 ASC Coax Connectors FROM | Hi-Z 4-Phase controller (original unit) TO | Hi-Z 4-Phase controller (new Hi-Z 4 controller) TO | Reconnect Verticals to Hi-Z 4 ASC |
|---------------------------------|--|--|-----------------------------------|
| Ant1 1 | Ant1 | | |

| | | | |
|---------------------|------------------|------|--------------|
| Ant2 1 | Ant2 | | |
| Ant3 1 | Ant3 | | |
| Ant4 1 | Ant4 | | |
| Ant1 2 | | Ant1 | |
| Ant2 2 | | Ant2 | |
| Ant3 2 | | Ant3 | |
| Ant4 2 | | Ant4 | |
| Installed Verticals | | | RECONNECT TO |
| Ver1 | | | Ver1 |
| Ver2 | | | Ver2 |
| Ver3 | | | Ver3 |
| Ver4 | | | Ver4 |
| See Fig. 2 below | See Fig. 1 below | | |

Connect one RG6 cable from the output of the NEW Hi-Z 4 phase controller to the input connector of the NEW Hi-Z 75Ω in-line pre-amp. The output of the NEW Pre-amp connects like your existing system. If there is an in-line filter it will be installed between the output of the phase controller and the input of the pre-amp. Output of the pre-amp goes to the Hi-Z 75/50Ω transformer in the shack.

Connections for the Hi-Z 8A ASC ONLY

You will be making the same connections to the second Hi-Z 8 phase controller as implemented in the first install.

Disconnect the 8 verticals coaxes (Ant1, Ant2, Ant3, Ant4, Ant5, Ant6, Ant7 and Ant8) from the current Hi-Z 8 phase controller. **The coaxes will be reconnected as per the chart below.**

Wiring:

Jumper power wires (13.8VDC, GND) to the 2nd Hi-Z 8 phase controller AND to BOTH of the Hi-Z 4 ASC from current phase controller. Connect the second control run from the CTRL1, CTRL2, CTRL3, CTRL3, CTRL4, CTRL5 at the SECOND Hi-Z 8 phase controller to the same terminals on the SECOND shack switch.

Chart - Wiring Connections (Conn = connection(s))

| Wiring Connect TO | 13.8VDC | GND | CTRL1 | CTRL2 | CTRL3 | CTRL4 | CTRL5 |
|---|---------|--------|--------|--------|--------|--------|--------|
| Hi-Z 4-8PRO | 2 conn | 2 conn | 2 conn | 2 conn | conn | | |
| Hi-Z 8A phase controller (2each) | 2 conn | 2 conn | 2 conn | 2 conn | 2 conn | 2 conn | 2 conn |
| Hi-Z ASC (2 each) | 2 conn | 2 conn | | | | | |
| Hi-Z 75Ω In-line Pre-amp (2 each Hi-Z 4-8PRO ONLY) | 2 conn | 2 conn | | | | | |
| | | | | | | | |

Coax:

Connect the 3 foot RG6 cables (16 each) as follows: *The 8 element system uses 2 of the Hi-Z 4 ASC controllers, pay close attention to the RG6 connections as per the chart below, noted as **Hi-Z 4-1 ASC** and **Hi-Z 4-2 ASC**, also note the **block diagram**.* . HINT: Make another copy of this chart as a check off list while making these connections.

Connections for the Hi-Z 4-8PRO & Hi-Z 8A ONLY

Is the same as Hi-Z 8 except connect CTRL1, CTRL2 and CTRL3.

Coax connections are the same is the Hi-Z 8, except the pre-amp is inserted after the phase controllers. Use the chart below.

| Hi-Z 4 -1 ASC Coax Connectors FROM | Hi-Z 4 -2 ASC Coax Connectors FROM | Hi-Z 8-Phase controller (original unit) TO | Hi-Z8-Phase controller (new Hi-Z 8 controller) TO | Reconnect Verticals to Hi-Z 4-1 ASC | Reconnect Verticals to Hi-Z 4-2 ASC |
|---|---|---|--|---|---|
| Ant1 1 | | Ant1 | | | |
| Ant2 1 | | Ant2 | | | |
| Ant3 1 | | Ant3 | | | |
| Ant4 1 | | Ant4 | | | |
| Ant5 1 | | | Ant1 | | |
| Ant 6 1 | | | Ant2 | | |
| Ant7 1 | | | Ant3 | | |
| Ant8 1 | | | Ant4 | | |
| | Ant1 2 | Ant5 | | | |
| | Ant 2 2 | Ant6 | | | |
| | Ant 3 2 | Ant7 | | | |
| | Ant 4 2 | Ant8 | | | |
| | Ant 5 2 | | Ant5 | | |
| | Ant 6 2 | | Ant6 | | |
| | Ant7 2 | | Ant7 | | |
| | Ant 8 2 | | Ant8 | | |
| Installed Verticals | | | | RECONNECT TO | RECONNECT TO |
| Ver1 | | | | Ver1 | |
| Ver2 | | | | Ver2 | |
| Ver3 | | | | Ver3 | |
| Ver4 | | | | Ver4 | |
| Ver5 | | | | | Ver1 |
| Ver6 | | | | | Ver2 |

| | | | | | |
|------|--|--|--|--|------|
| Ver7 | | | | | Ver3 |
| Ver8 | | | | | Ver4 |

Connect one RG6 cable from the output of the NEW Hi-Z 4 or Hi-Z 4-8PRO phase controller to the input connector of the NEW Hi-Z 75Ω in-line pre-amp. The output of the NEW Pre-amp connects like your existing system. If there is an in-line filter it will be installed at the output of the phase controller. Connect feed RG6 and run coax into shack. Install Hi-Z 75/50Ω in the shack and connect 50Ω coax to the output to RX. Hi-Z 8 has the pre-amp internal to the phase controller.

DC Wiring

The ASC enclosure(s) only require +13.8VDC and Ground for power connections.

Shack Preparation and Basic Operation

1. Locate the placement of the shack switch.
2. Verify the voltage level is in the 13.8 VDC area. Depending on the length of the control cable this voltage may need to be adjusted upwards to compensate for any voltage drop.
3. Direction control. Typically; Position 1 = N, 2= NE, 3 = E, 4 = SE, 5 = S, 6 = SW, 7 = W and 8 = NW.

Power Up and System Checks

1. Turn power on at each of the shack switches. One yellow direction LED should be ON. Rotate the direction rotary switch and verify that all 8 LEDs sequence correctly.
2. Tune to 160 or 80 meters. Switch On and off the power at the Hi-Z shack switch and you should hear the noise floor increase when switched ON. If able, compare to existing antennas, the noise floor on the Hi-Z system will likely be lower.
3. Test the directivity by tuning the AM broadcast band above 1 MHz (with no HPF or BPF filter installed). When pointed at a station and the signal is peaked, turn the control to other directions and observe the F/B and F/S.
4. On the air, especially low angle DX, you will observe best performance in terms of pattern. When a signal is peaked in one direction, try switching in the direction either side you will see the signal decrease considerably. As you continue to turn the direction control and observing the signal level, the F/S and F/B performance will become apparent.
5. The advantage is the S/N that our system produces. Good DX'ing.
6. **Check both operating stations to see that the Hi-Z ASC is functioning correctly. Check different directions at the two Station positions and verify the direction controls are functioning. On the Hi-Z 4 and Hi-Z 4-8PRO ASC system you have both separate direction and different band control. With the Hi-Z 8 ASC you have concurrent direction control at the two operating positions. Hi-Z 8 is a mono-band array.**

TROUBESHOOTING also see http://www.hizantennas.com/hiz_faq.htm

FIRST- Verify all your connections and voltages at terminals.

Spurs every 10 KHz across 160 meters. Check the Hi-Z PLUS6 Amp connections one of the Hi-Z PLUS6 Amp has the two wires (Antenna, Ground) reversed, verify these connections are wired correctly.

Some switching power supplies can cause this symptom.

Measure the DC voltage on the vertical. From ground to the vertical with a DVM you should measure ~4 volts VDC. Improper voltage readings indicate wiring problem.

Low IMD. Verify that the voltage at the +13.8VDC and Ground terminals at the phase controller measures ≥ 12.0 VDC. Sometimes due to control cable lengths one may need to consider a separate adjustable voltage power supply to insure correct operation voltage for the Hi-Z system.

Hi-Z PLUS6 Amps – No RED LED ON

Verify that there is a jumper on the phase controller between the 13.8 VDC and Coax Power In terminals.

Birdies, Heterodyning

Causes include close proximity to broadcast stations.

Solutions: One the source of this problem is located, the insertion of either a Hi-Z BPF or Hi-Z HPF, depending on the source of interference, should be inserted between the output of the phase controller and the input to the 75 Ω in-line pre-amp.

Directions Seem Wrong

Verify that you connected vertical 1 to controller Ant1, vertical 2 to controller Ant 2 and so on.

Verify that all of the Hi-Z phase controller and Hi-Z 4 and 8 ASC controllers are secure and cabled correctly as per the diagrams above.

For other topics see technical & application notes at http://www.hizantennas.com/application_notes.htm



APPENDIX A

F connector tightening procedure. Placing a 7/16" wrench on the chassis connector while holding it tight, place another 7/16" wrench over the Male connector housing and tighten until snug. Do not over tighten this F connector. View pictures below.

