SteppIR Verticals!

BigIR III: 3.5 MHz through 54.0 MHz Continuous Coverage (with optional coil)

Small IR: 13.8 MHz through 54.0 MHz Continuous Coverage

No traps, coils, capacitors or linear loading of any kind

Full continuous coverage, including WARC bands - without compromise!

Fiberglass element resists wind and ice

World's safest vertical!

Low visual profile - excellent for stealth installations

Works on the same principle as our Yagi - copper strip adjusts inside of fiberglass elemen

Antenna is always at ideal length - no running outside to make adjustments!

BigIR III
With 80m Coil

SteppIR Antennas

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Finally! A high performance, low VSWR vertical antenna with excellent bandwidth and no compromises!

Verticals are available that cover 40 meters through 6 meters by using coils, traps, capacitors or linear loading, but do so at the expense of significant performance reduction. With the addition of the WARC bands on 30m, 17m and 12m, multi-band vertical antenna performance has clearly become a challenge.

A vertical antenna that is precisely adjustable in length while in the air solves the coverage problem, and in addition has vastly improved performance over existing fixed length verticals. The ability to tune the antenna to a specific frequency results in excellent performance on every band – and this means the entire band, with very low VSWR. Resonant antennas must be made a specific length to operate optimally on a given frequency. So, instead of trying to "trick" the antenna into thinking it is a different length, why not just change the antenna length? This is what we have done with the new SteppIR verticals. Each vertical antenna consists of one spool of flat copper strip conductor mounted in the antenna housing. The copper strip is perforated to allow a stepper motor to drive it with a sprocket. Stepper motors are well known for their ability to index very accurately, thus giving very precise control of the antenna length. In addition, the motors are brushless and provide extremely long service life. The copper strip is driven out into a hollow, lightweight fiberglass support element (the support element stays extended at all times), while the conductive strip is adjusted to the exact required length using the microprocessor based controller (via 22 gauge 4 conductor shielded control cable). The antenna is easy to assemble and is extremely portable.

- NEW -

** Optional 80m vertical rotary loading coil allows 80m - 6m continuous coverage . Requires a second 4 conductor cable. **1500 Watt limit with coil.**

Specifications	BigIR III	Small IR
Weight	15 lb 6.8 kg	12 lb 5.44 kg
Max. wind surf. area	1.9 ft² 0.17 m²	1.0 ft² .09 m²
With Multiple Sets of Guys and High Wind Option	Up To 125 MPH	100 MPH EIA 222-C
Un-Guyed wind survival	75 mph	100 MPH
Element length	32 ft 9.75 m	18 ft 5.49 m
Power Rating	3000 Watts Key Down**	3000 Watts Key Down
Frequency coverage MHz	6.9 -54.0**	13.8 - 54
Cable Requirements	4 cond**	4 cond
Tuning Rate	1.33 ft / Second	1.33ft / Second
Radial System Recommended?	*YES	*YES
Feed Type	End fed	End fed
Wavelength	1/4	1/4

SteppIR Microprocessor Based Controller
Controller dimensions: 6" L x 3" H x 3.5" D

*** Minimum recommended radial system:**

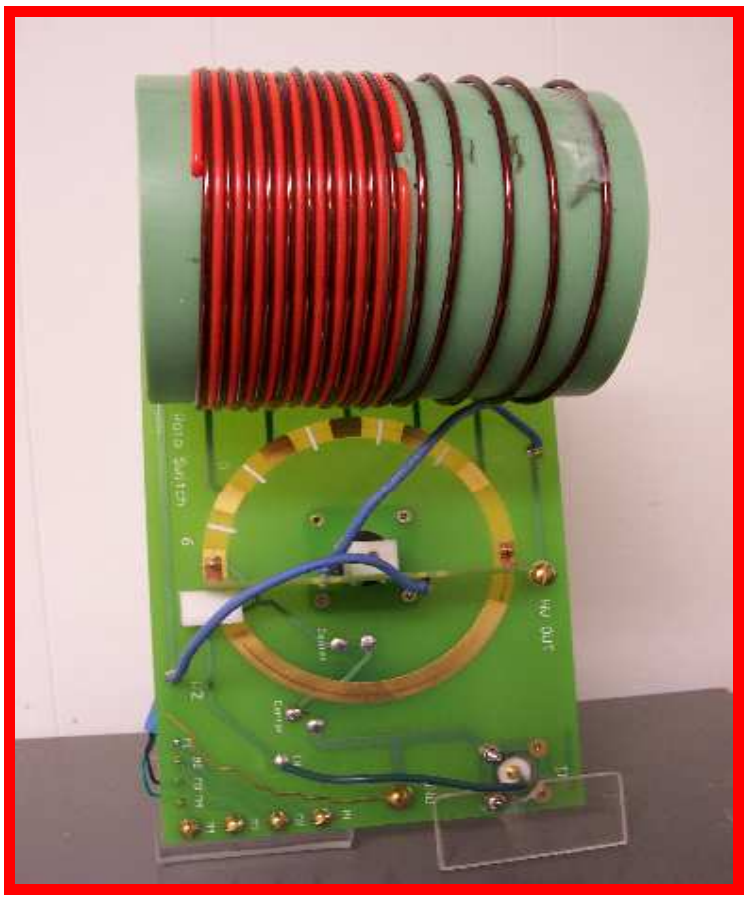
At ground level: eight 0.1 wavelength radials cut to the lowest frequency of operation (14 ft at 7 MHz, 8 ft at 13.8 MHz) as close to ground level as possible. Additional radials will increase performance. Above ground: two radials cut to the specific frequency for each band of operation. If you are using wire, we recommend insulated. Note: In addition to these guidelines, there are many different ways to create reasonable grounding systems.

StepIR™

Antenna Systems

Yagi • Dipole • Vertical (Patent # 6,677,914)

80m Vertical Rotary Loading Coil



(shown without weatherproof housing)

(mounted on the BigIR MK III)

- **Allows 80M – 6M continuous coverage with BigIR with 1.0:1 SWR (Approximately 60 khz 2.0:1 bandwidth on 80M without tuning the antenna)**
- **High Q 4.5" coil has a Q of 500 resulting in very efficient operation**
- **Stepper motor driven rotary RF switch easily withstands the very high voltage inherent in shortened antenna designs and allows the controller to automatically select the most efficient tap. (requires 4 conductor cable)**
- **At 40M and above the coil is completely switched out to avoid degrading high frequency performance**

⇒ **Modular design allows easy addition to any existing BigIR (the BigIR MKII is rated at 1500W below 7 mhz and 3000W everywhere else. Non MKII BigIRs are limited to 500W below 7 mhz) The BigIR can be upgraded to a BigIR MKII – Call the factory**

Radial Systems

All vertical 1/4 wave monopoles need some form of counterpoise in which antenna image currents flow to work efficiently. This counterpoise usually consists of a system of radial wires placed either on the ground or elevated above ground. There is no "free lunch" with 1/4 wave verticals, you must have a radial system to both shield the antenna from ground and provide a return path for the rf current.

This is not an in depth publication but simply a general guide on installing and using the SteppIR verticals. There is much more information available in various publications if you need it. The ARRL Antenna Handbook is a good source for additional information.

The question of how many ground radials are needed is discussed below for both ground mounted and elevated verticals. It should be noted that radial systems only cure *ground return losses*, (rf absorption by earth and lack of path for ground return current due to low conductivity of earth). Far field losses are highly dependent on the conductivity and dielectric constant of the earth around the antenna, extending out as far as 100 wavelengths from the base of the antenna. Over real earth there is little or nothing you can do to eliminate this loss except get to salt water! This is the reason verticals never achieve the low angles of radiation they are capable of when placed over real ground.

Ground Mounting:

PROS

- The radials can be any length and they work on all frequencies
- Easy to mount
- Easy access
- Lower visual profile

CONS

- Takes 120 radials to equal an elevated vertical with 2 resonant radials
- Surrounding objects can reduce signal strength

Performance vs Number of Radials					
No. of Radials	16	24	36	60	120
Radial Length in wavelengths	.1	.125	.15	.2	.4
Power Loss at Low Angles	3 db	2 db	1.5 db	1 db	0 db

Note: Generally a large number of shorter radials offers a better ground system than a few longer ones. Wire sizes from #4 to #20 will work very well. A 50 ohm SWR of 1:1 isn't necessarily a good thing. The worst case ground system above has the lowest SWR.

Elevated Mounting:

PROS

- + 90% efficient with two .25 wavelengthradials
- Antenna is generally more "in the clear", so surrounding objects don't cause as much attenuation
- A peaked metal roof will make a very good all-frequency radial system
- Overall less radial wire is required

CONS

- Requires two .25 wavelength radials for each band of operation (radials interact, so spacing will affect length)
- Mounting is generally more involved
- Visually higher profile
- Must be mounted high enough that people won't walk into it
- Needs to be about .2 wavelengths high to get an ideal 50 ohm match
- Radials need at least a 20° slope to get a good match
- Involves adjusting and fine tuning the radial lengths