



How to Use a Kite Antenna in Amateur Radio

Amateur radio (Ham radio) operators and engineers, have been experimenting with radio and antennas since Marconi. The use of a kite to support an antenna makes for great days operating and a wonderful HF antenna.

Steps

1 Be a licensed amateur radio operator to transmit on the radio. When planning this project, keep safety in mind as well. First, do not fly kites near power lines, near airports or where there are low-flying aircraft, near busy residential or industrial areas, or anywhere when there is a chance of lightning. Moreover, be sure to ground the antenna wire, as discussed, to avoid shock.

2 Collect the equipment together. For this project, you'll need the following equipment:

- Portable HF radio
- Power supply (12 v battery) or mains
- Lifting kite and line – the kite that you choose is very important, lifting kites usually use just one line and once in the air you have no control over the direction of flight. The type of kite can vary from a small box kite to a large lifting kite.
- Antenna wire
- Earth rod
- RF choke or high value resistor
- Antenna matching unit.

3 Get a strong control line. This is the line that provides the security and keeps you kite safely attached to the ground. The line will need to be very strong for lifting kites, and you will need to see advice at the time you purchase your kite. One suggestion is climax Dacron it comes in various different sizes.

4 Check local laws on the maximum height of your kite. In the United Kingdom it's 60 metres, 200 feet above the ground.^[1] In the USA, it is recommended to stay below 500 feet above ground level, as aircraft rarely fly that low but do check local regulations first before assuming this is okay.^[2]

5 Select some wire to use for the antenna and also decide how long the wire needs to be. Taking the UK maximum height of 60m, 200 feet, we need to do some calculations. A kite doesn't fly vertical, so to get a kite 60m or 200 feet into the air you will need to let out, say around 80m, 262 feet of line.

- 80m, 262 feet of wire, makes for a good antenna on 1.9 mhz or 3.5 mhz. The antenna will also work on 7 mhz but you will require an antenna matching unit.
- Look for lightweight but strong wire. Many electronic shops do large reels on single colour wire around 100m per roll "equipment wire". Be aware that some insulated wire is more prone to building up static charges than others. For example, kynar insulated wire wrapping wire picks up static very quickly. Surplus antenna wire, which consists of braided copper around a steel core, works much better and does not build up nearly as much static.
- Get an earth rod. This is very important as voltages may be induced on the wire you are flying, and these need to be discharged safely to ground. You can pick up an earth rod from a DIY store.
- It is recommended that you use of either an RF choke or a high value resistor (100k, for example) from the random wire input to the ground. This should be connected BEFORE launching the kite. Static can build up on the line very rapidly.
- You will need some incidentals, such as a hammer to bang in the earth rod, a bungee cord and a couple of climbing style carabiners. The carabiners are used to attach the kite line to the kite, and also to get the kite

down at the end of the day.

6 Find a suitable flying site, check local laws and book the right weather. As earlier stated, you should not fly your kite close to an airfield or in a busy residential area but this article assumes you have a nice suitable location in mind.

- Lay out the kite, and run out the control line to its full extent. Do the following to prepare the kite and antenna for flight:
- Beside this, run out the wire antenna. The wire antenna should be a good 5 to 10 meters (longer than the control wire). Do NOT connect the wire antenna directly to the control line as this can cause the line to fail. The two lines should be separate; it is recommended that you use a small length of rope on the kite before attaching the wire antenna.
- Secure the main control line to the ground. You won't be able to hold the kite because these kites pull far too much, so you need to locate a suitable fence or tree. You can use a ground stake, but these are not always strong enough and you won't be able to pull a tree out of the ground... hopefully.
- Put the earth rod into the ground. In the first instance, attach the wire antenna to the earth rod.
- Use the RF choke or a high value resistor from the random wire input to the ground.
- Have the battery and radio and matching unit close to the earth rod.
- At this point, you should be ready to go. Check once again that the weather is OK, with no lighting forecast.

7 Walk over to your kite, ensure the lines and antenna wire are not tangled and launch the kite. If the wind conditions are OK this should soar into the air taking the antenna wire with it.

8 Check the tension on the antenna wire. As it's 5 to 10 meters (16.4 to 32.8 feet) longer, it should sag down below the kite line. You can adjust this later.

9 Earth the antenna matching unit, and then connect the long wire antenna. You may want to let out a little more kite line to take up the slack in the antenna wire.

10 Tie a knot in the antenna wire about 2 feet above the ground, and attach a bungee cord. This allows the kite line to jerk in the wind, but dampens the pull on the antenna wire.

11 Connect the antenna matching unit, and tune the antenna for the band you would like to operate.

12 Get the kite down. This can be fun, depending on the strength of wind. Use a carabiner, and walk down the line. You will find the pull on the line is too great to wind the line in, and getting the kite down needs to be completed in a safe and controlled way. The line can be very dangerous if it pulls through your hand, causing burns or worse. The carabiner method keeps your hand and fingers safe, and does not cause wear to the kite lines.

13 Have fun, and be safe. Flying kites can be dangerous, exercise all precautions to ensure it stays fun and is not endangering anyone. The safety of you and others has to be number one.

Tips

- Anything more than 5/8 wavelength of wire in altitude is a waste.
- Don't forget to maintain a good radial system for ground. This is much easier when you're over water than land.

Warnings

- Static on your antenna system can harm you and damage your radio, use an earth rod and isolate your radio through an antenna matching unit.
- Check the weather, and make regular checks for lightning
- Kite flying near power lines is dangerous. If you can see power lines from your flying site, they are too close.

Sources and Citations

1. <http://www.thekitesociety.org.uk/KiteRegs.htm>
2. Jake Brodsky's advice, <http://www.wikihow.com/Discussion:Use-a-Kite-Antenna-in-Amateur-Radio>

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