

## **MLBA Magnetic Longwire Balun Antennas**

**Completely assembled wire antennas offering reception with equal sensitivity on long, medium and shortwave.**

### **Features**

\* Frequency range depends on the model chosen:

MK1 & MK3 : 100 kHz - 40 MHz, length = 12.5 metres or 38 feet

MK2 & MK4 : 100 kHz - 30 MHz, length = 20 metres or 60 feet (the MK 2 & MK 4 offer more signal on long- and mediumwave and can be used at frequencies below 100 kHz with a slightly reduced output)

\* RG 58/u coaxial cable between the antenna and receiver. This ensures shielding of unwanted interference from computers, TV sets, light dimmers, fluorescent lights, etc.

\* No antenna tuner needed. The reception characteristics remain constant over the entire specified frequency range.

\* Grounded antenna wire. This allows unwanted static build-up to leak away harmless to earth without damaging the receiver.

\* Magnetic field transfer of the antenna signal to the receiver ensures a highly reduced level of static and man-made noise.

\* Completely weather-proof.

### **Wire antennas**

It is often forgotten that a good receiver cannot deliver the best results without an adequate antenna. The practice shows that many listeners forget this important fact and, as a result, never get the best out of their radio. Even the best receivers cannot pick up weak signals with a bad antenna. Passive antennas, such as longwires and those which are fed in the middle or at 1/3 (such as T-antennas or windoms) are known as the best all-round listening antennas you can select, providing they are hung at the correct height. The fact that they don't contain electronics ensures that they do not generate unwanted intermodulation products. Due to their size they are also less sensitive to multi-path propagation compared to vertical antennas. But there are also disadvantages!

### **Most wire antenna do not offer equal sensitivity on all frequencies**

Most modern shortwave have a 50 Ohms impedance at the antenna input. The impedance of the antenna must therefore lie in the order of 50 Ohms, otherwise an optimal transfer of energy between the antenna and receiver cannot occur. Dipoles offer the correct matching at one single frequency band, namely the resonant frequency for which the antenna has been cut. This frequency is determined by the length of the antenna. So a dipole cut for 5 MHz only gives the optimum performance around 5 MHz, although reasonable results can also be expected at 15 MHz. This problem is often solved by making a number of "traps" in the antenna which resonate at different frequencies. The end result being that the antenna performs at several frequency bands. However, for serious shortwave listeners who want to listen to entire spectrum, there are still too many gaps where reception using a trapped dipole is only marginal. In addition, trap dipoles that perform well at interesting frequencies such as 3.5 or 1.6 MHz are very long, too long for most listeners with limited space in the garden.

The same applies to end-fed antennas, usually termed "longwires". The impedance of a real longwire antenna is high (in the region of 600 Ohms) but this is only the case when the antenna is at least three wavelengths long at the lowest frequency of interest. For 3.5 MHz (80 metre amateur radio band) the length must be 240 metres (i.e. 720 ft). For shorter end-fed wires (random wires, but usually also –but wrongly- termed "longwires") the impedance is not constant. This means that a coaxial lead-in cable cannot be used: At frequencies where the antenna impedance is high, the 50 ohms coaxial antenna cable and the 50 ohms receiver short-circuit the antenna with signal loss as result. A single wire, mounted on insulators has to be used as lead-in wire. This wire picks up interference and noises from the interference field in- and around every house. An antenna tuner is needed to match the antenna impedance to the receiver impedance. Since this tuner has to be adjusted each time the tuning control on the radio is altered, overall tuning becomes more complex. Some listeners use computer controlled receivers. However, computer control of an antenna tuner for receiving is difficult, if not impossible.

Many shortwave listeners are faced with limited space to put up an antenna. Few people have the room to put up a 40 metre (120 ft) antenna. In most cases 20 metres (60 ft) is the maximum, often even less. Many simple tricks are used to improve reception, such as disconnecting the braid of the coaxial cable by using

only the centre pin of the antenna plug. This gives more signal, but the increase in man-made noise is usually enormous. In fact, the shield of the coaxial antenna cable is now functioning also as antenna. Not only for the wanted radio signals, but also for interference sources such as TV sets, computers and light dimmers. This results in a very bad signal-to-noise ratio of the received stations.

### **The MLBA antenna**

RF Systems has a solution: The MLBA: Magnetic Longwire Balun Antenna. This is a short, end-fed wire antenna which uses a RF Systems Magnetic Longwire Balun as matcher between the antenna and the coaxial lead-in cable. The MLBA is available in four types. The MK 1 has a length of just 12.5 metres (38 ft) and yet offers a frequency range of 100 kHz - 40 MHz. The MK-2 offers stronger signals in the long, medium and tropical shortwave bands, is 20 metres long (60 ft) and offers reception between 100 kHz - 30 MHz. The MK 3 is a professional, all stainless steel version of the MK 1, and the MK 4 is the professional version of the MK2. These versions are for instance used at embassies and the BBC monitoring service.

But there are other advantages. It is now possible to use ordinary RG 58/u coaxial cable between the antenna and receiver, instead of a single wire. This is much easier to mount and shields against man-made interference. The sensitivity of the antenna remains relatively constant throughout the entire frequency range. There are no frequency "blank spots" such as with dipoles, trap-dipoles and similar antennas. An antenna tuner is no longer needed. The wideband reception is possible thanks to the Magnetic Longwire Balun invented by RF Systems. This is a special impedance matching transformer which ensures that the varying capacitive impedance of the short end-fed wire (often termed as "longwire") is matched to the 50 Ohm impedance of the coaxial cable. Statics can build up as a result of nearby thunderstorms or during very dry weather. The Magnetic Longwire Balun by RF Systems ensures that the antenna wire is connected to earth, allowing this harmful static build-up to leak away to earth, thereby protecting the receiver input circuitry. Inside the hermetically sealed and waterproofed casing, the antenna signals are transferred to the receiver by a magnetic field. This magnetic transfer technology acts as a shield of Faraday. The high static noise at long, medium and tropical band wavelengths is therefore significantly reduced. The MLBA is entirely passive and cannot generate unwanted intermodulation products.

### **Easy to mount**

The MLBA from RF Systems is very easy to put up. It comes fully assembled and ready to hang. Two items are not part of the set. The RG 58/U coaxial cable is not included since the length will vary depending on the situation. A PL 259 plug for the connection of the coax to the MLB is included, together with the RS - 1 sleeve to protect this connection from rain and moisture, but you will also need to purchase a suitable connector to fit in the antenna socket of the receiver. Check to see which type is required for your receiver. Most receivers have a SO 239 jack, so a PL 259 plug is necessary.

MLB antennas can be mounted either horizontally or vertically, but extensive tests at various sites around the globe show that the antenna is best hung at an angle of 30 degrees with respect to the ground level. This gives a nearly omni-directional receiving pattern and mixed polarisation (partly horizontal and partly vertical), which reduces polarisation fading. Try to hang the antenna as high as possible: how higher, the better the reception of long distance stations, coming in at low angles. The Magnetic Longwire Balun Antenna is designed for receiving only. RF Systems uses high quality UV-resistant plastics, Dracon cord, and RF Systems own pre-stretched very high quality litze antenna wire, covered with UV light and air-pollution resistant poly-urethane to ensure that the antenna will survive years of punishment from the weather.

### **Professional versions**

The MK 3 and MK 4 are professional versions of the MLBA MK 1 and MK 2. Their electrical performance is the same, but all parts, including the antenna wire it selves and the MLB are made of corrosion free stainless steel. The MLB is the stainless steel MLB Marine, also used on ships. The MLB Marine has no connector. Instead, 15 metres of very high quality coaxial cable is already mounted to this MLB Marine, to ensure that it is absolutely water- and weather proof. Two heavy-duty egg-insulators are mounted on each end of the antenna. The MK 3 and MK 4 can stand strains of more than 400 kg, temperatures from - 50 C to + 90 C and get not worse by air-pollution. The MK 3 and MK 4 are recommended for locations where extreme weather conditions demand an extremely sturdy construction (hurricane- and coastal area's) or where regular maintenance is impossible. MK 3 and MK 4 antennas are in daily use at embassies, the BBC Monitoring and other governmental- and military monitoring stations.

### **Make your own antenna**

For those who want to make their own antenna, RF Systems also supplies the standard Magnetic Longwire Balun, the MLB Marine, litze antenna wire in copper and stainless steel, high quality coaxial cable, egg-insulators and special polyester cord as a separate items. See the other pages on this website.

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