# Two Antennas for Differential Mesoband Operation

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In the search for high-power mesoband radiators, a simple and interesting source is the switched oscillator. This produces an approximate damped sinusoid when operated into a high-impedance load (antenna) from a low-characteristic-impedance quarter-wave transmission-line oscillator. There is also a voltage step-up going into the antenna.

Various antennas can be attached to the switched oscillator to give an effective high-power radiator. These include TEM-fed reflectors and (folded) horns. The present paper continues this discussion.

An interesting variant of the switched oscillator is the differential switched oscillator. This has the advantage of increasing the voltage output (and the associated power) by doubling the differential versus single ended voltage for the same current and oscillator characteristic impedance. It is effectively like two oscillators back to back, sharing the same switch. It is appropriate that such a source drive a differential antenna or two antennas symmetrically configured.

One general approach to the antenna problem is to use two antennas, one connected to each oscillator output. These should each present the same load to the oscillator and have the same antenna gain. This can be achieved by the use of symmetry considerations in the oscillator/antenna system. Such symmetry can utilize the point symmetry groups (rotation and reflection). Except for symmetry transformations, the two antennas are then identical.

Differential sources can then be used with two-element antenna arrays, thereby utilizing an advantage of a differential switched oscillator for mesoband high-power radiation. Here we have considered symmetrical antenna arrays (two elements). While helical antennas have some interest for mesoband radiation, one need not limit ones consideration to this type of antenna.

Other less symmetrical configurations are also possible. For example, for helical antennas one can displace one of a pair of counterwound antennas an appropriate fraction of a wavelength to achieve a linear polarization with arbitrary (or even variable) polarization angle.