

Time of Arrival Radio Direction Finder.

Time of arrival (TOA) RDF units are simple and very useful. Various designs have been distributed over the years, and here is another one. This Kit Developed by James Lee N1DDK is an easy to build version of the design from our very own Rich Harrington, KN6FW. These units are so versatile and simple to make, and we are making the schematic available to the Ham community. They are so simple, you can build one for each of your vehicles, just to have in case of an emergency transmitter hunt.

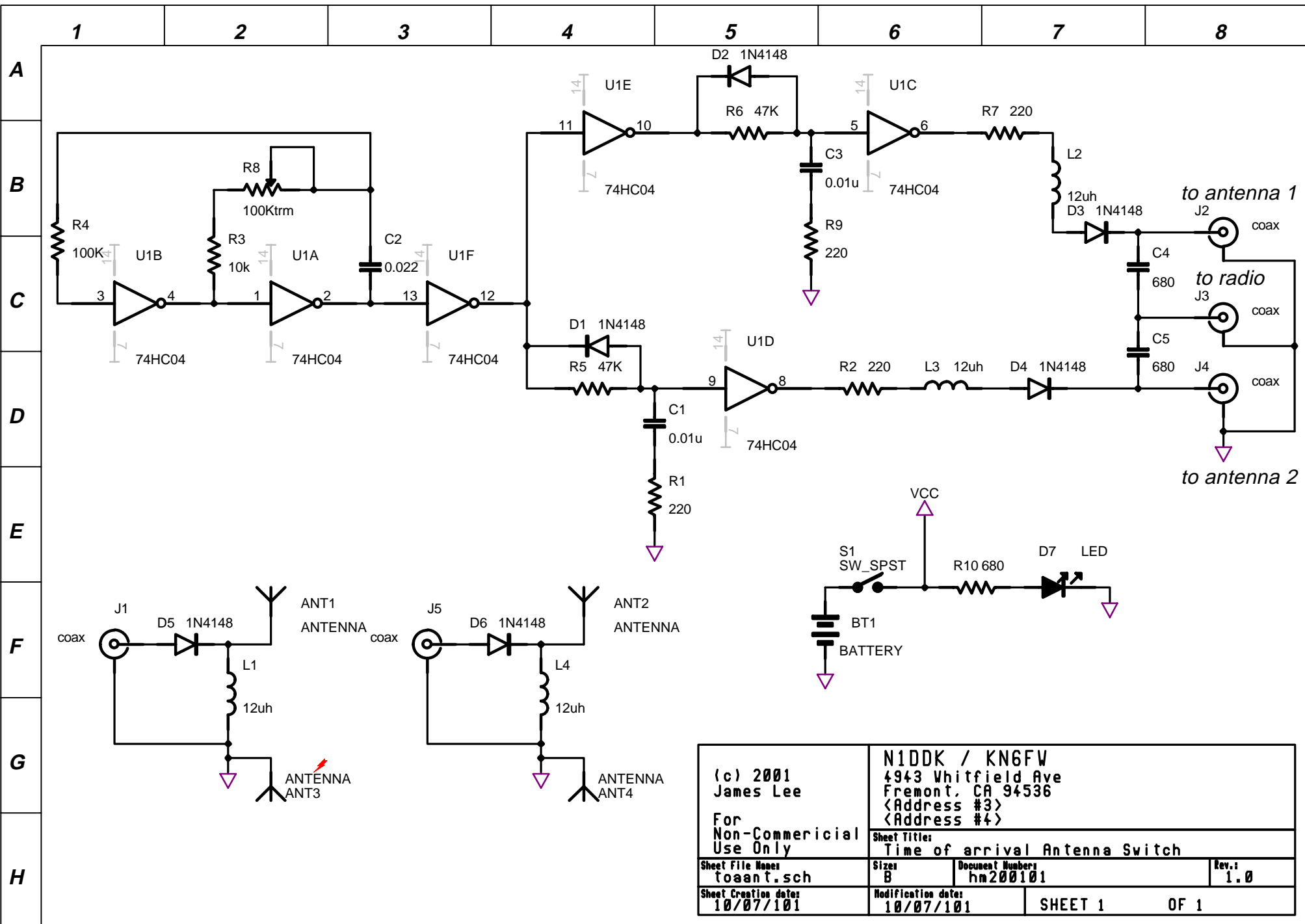
TOA units work by exploiting the phase shift that occurs when the path length from the transmitter to the TOA unit elements is unequal. This phase shift produces an audio tone in the radio. When you minimize the audio tone, by rotating the TOA unit, you can determine what line the transmitter is on (in front of you, or behind you).

Moving will allow you to triangulate on the transmitter.

The following figure illustrates what happens. The TOA in position 1 is not rotated to "face" the transmitter. As a result, the path lengths from the transmitter to each antenna (A and B) are unequal. This results in an audio tone being heard from the radio. Position 2 and 3 both are rotated until the audio tone minimized. In position 1, the transmitter is then known to be on line T1. Because the transmitter could be in front of the TOA or behind it, another position is used to get a second bearing. Position 3 gets the bearing T2. Where T1 and T2 cross is the transmitter.

This time of arrival RDF unit sees lots of use in San Francisco Bay Area transmitter hunts. Early editions of the time of arrival unit were built with welding rod antenna elements, various structural elements, and more complicated circuitry. This current design has improved because of continuous improvements. The features of this design are:

- Adjustable tone. This allows you to get the tone you need to clearly hear the null.
- Low current consumption. The circuit is built with 74HC logic parts.
- Runs from two AAA cells.



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