Receiver and Antenna Kit for EclipseMob Participants

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EclipseMob is a collaborative effort to crowdsource a large-scale geographically distributed measurement of LF radio wave propagation during the August 2017 solar eclipse. The path of the eclipse traverses the contiguous United States, presenting a unique opportunity to study the time and location dependence of the ionospheric disturbance caused by the eclipse. The availability of low-cost components and modern GPS-based location services allows the EclipseMob project to coordinate a nationwide measurement performed by hobbyists, students, educators and other citizen scientists.

EclipseMob has distributed a do-it-yourself receiver and antenna kit to measurement participants across the United States. The center-tapped loop antenna and simple receiver designs were developed for easy assembly by non-expert builders; no tools are required besides a screwdriver and the wire strippers included in the kit. A/D conversion and a local oscillator signal are provided through the audio port of a smartphone (to be provided by the user), which simplifies the circuit design and reduces the per-kit material cost. In addition to recording the data and providing a local oscillator signal, the EclipseMob smartphone app provides GPS time and location stamps for recorded data files and uploads them to the EclipseMob server. Details of the EclipseMob kit will be presented in this paper, including comparison of the performance of two variations on the receiver circuit.