
A new type of Lightning Electric Field Measurement and Transmission System for Board Structure

Introduction:

Lightning is a frequent weather phenomenon, in which lightning radiation is one of the main causes of lightning disaster, lightning electric field research surge protector and other improvements have great guiding significance.

At present, the data acquisition card based on NI company is mainly used for lightning measurement. In the process of lightning electric field measurement, the collected signal is transmitted to the computer terminal for processing. But its transmission distance is far, its anti-interference ability is poor, and its price is high.

Based on the analysis and research of Lightning Electric field, we designed a lightning electric field measuring instrument based on board and card, which solved the problem of remote processing. It mainly consists of antenna, weak signal detection, broadband amplification, high-speed sampling, VGA display, Beidou positioning and other parts. The inductive antennas for lightning electric field are mainly divided into simulation layer, induction layer and stratum. When there is an electric field perpendicular to the planar antenna, the number of induced charges on the horizontal planar antenna changes, forming the induced current. The voltage signal directly proportional to the electric field intensity is obtained by the post-stage circuit processing, and is sent to the FPGA for processing by high-speed acquisition. The main control uses Arrix-7 series of FPGA, and the Verlog hardware language part is combined with the MicroBlaze software core, which greatly improves the application of the FPGA.

The characteristics and innovations of this system have the following points:

By using FPGA autonomous programming, high speed acquisition is realized, and the cost is greatly reduced.

The products of the same kind often need computer software to display the information of collection, and the degree of integration is low. The system directly drives the VGA display to display the collected curves and lightning electric field information, and adds the warning function. It is possible to improve the portability of the system and make it possible for a large scale to be distributed.

The anti noise ability of the system is improved by using new devices and differential signal processing.

The system realizes the measurement and location of lightning electric field very well.

System picture:



