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DESIGN AND DSP IMPLEMENTATION OF PROXIMITY SPACE RECEIVER BASED ON CCSDS STANDARD

Abstract

With the development of human deep-space exploration, it is necessary for different spacecraft to cooperate in some complicated situation. Based on the requirements, a proximity space receiver is designed according to the CCSDS 211 standard in this paper, solving the problem of information receiving which is caused by synchronization and channel fading. CCSDS protocols regulate that information in proximity space link is transmitted as frame, so frame synchronization directly affects the success of information receiving; meanwhile, channel estimation and equalization are needed because of the fast fading in wireless channel; therefore, this scheme includes three models: frame synchronization, channel estimation and channel equalization, which is suitable for proximity space environment and CCSDS standard. Finally, the design is implemented on DSP platform – C6455, verifying the correctness of the design and the accuracy of the received information. Results of the experiment indicate that this design totally fits the proximity environment.