

Development of light-weight wide-band receiver for future planetary explorers

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Light-weight wide-band receiver for planetary explorer missions and small satellite missions has been developed. The receiver covers frequency range from 10 kHz to 12.5 MHz by using digital down converter implemented with FPGA. By replacing analog local oscillators, mixers, and filters by firmware on the FPGA, weight of instruments can be reduced. FPGA-DDC also has following merits: CPU/DSP and memories become unnecessary for telemetry data rate reduction. Radiation protection can be performed by selecting anti-fuse type FPGA. Bread-board model (BBM) of FPGA-DDC receiver has been developed. It has been confirmed that dynamic range larger than 80dB in frequency range from 10kHz to 12.5MHz can be achieved by the FPGA-DDC technique.