

## FPGA Implementation of Streaming Filters for Space Applications

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**Abstract:** The objective of the work is to develop digital streaming bandpass filters and low-pass filters for space applications on the LPEX experiment to be flown on a future mission to Mars. The LPEX consists of a Langmuir probe (LP), an electric field (EF). The EF sensors are meant to detect variations in an ambient electric field in the wide frequency range, starting from DC to nearly 100 kHz. To detect electric field waves, the backend of the instrument employs filters conventionally analog filters are used but they suffer poor frequency response and SNR etc. Therefore, the optimum choice would use of Digital filters for such applications where they have linearity and steepness of roll-off are essential. The developed algorithms are simulated in the MATLAB environment and subsequently developed a streaming hardware architecture for the aforementioned filters. Later the designed hardware implemented in the field-programmable gate array Virtex ML605 Platform and reported the power and area analysis. The proposed work compared with the state-of-the-art-methods of computing FIR filter shows better throughput and speed.

### References:

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