Anand M. Sarvaiya, A signal acquisition interface for a DSP board, M. Tech. Thesis, Department of Electrical Engineering, Indian Institute of Technology Bombay, 1995.

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Abstract - Many applications involving DSP require handling of multiple input/output analog signals. Sampling causes aliasing at the input and spectrum repetition at the output. Therefore, anti-aliasing filter for inputs before A/D converter, and smoothing filter for outputs after D/A converter required. Further the choice of sampling frequency is often application specific.

The aim of the project is to develop a system which would extend the I/O handling of a PC bus-based DSP board having single analog I/O channel, with appropriate signal conditioning of input and output channels, for variable sampling rates.

An I/O expansion unit for the DSP board PCL-DSP25, based on TMS 320C25 DSP processor, has been developed which enhances the analog I/O handling of the DSP board from single analog I/O channel to four analog I/O channels.

An eighth order elliptic low-pass filter and Bessel low-pass filter have been implemented. Both the filters can serve as anti-aliasing filter for the input signals and smoothing filter for the output signals. Also a second order elliptic notch filter has been implemented to reduce any possible power-line interference at the input. The filters are implemented using switched capacitor circuits to achieve clock-controlled cut-off frequency. This feature makes the filters useful for variable sampling rates. A programmable timer/counter has been interfaced with the DSP board to make the cut-off frequency of the filters programmable by the DSP board.