ABSTRACT

Sigma Delta Modulator ($\Sigma\Delta$) is an analog pulse modulator which basic components are Integrator (Σ) and Difference Circuit (Δ) that makes an analog become a digital signal with the serial output, so from this modulator definiton usually called an A/D (Analog to Digital) Converter Sigma Delta. The principle of Sigma Delta Modulator based on some methods called Oversampling and Noise Shaping concept. The technique of Oversampling is a sampling method by using sampling frequency which the rate more higher than the sampling frequency if using Nyquist criteria. While, Noise Shaping is an effect of the circuit that can makes the quantization noise spread on higher frequency from the information signal, so it can decrease the quantization noise in baseband level. By using Oversampling and Noise Shaping, the SNR (Signal to Noise Ratio) which produced can be improved.

This final project of Sigma Delta Modulator had already designed and implemented on a simulation and hardware to change human voice (speech) as signal information which choosen in frequency 3 KHz, then change this signal become a digital signal which speed 64 KBps. The Sigma Delta Modulator that implemented on this final project are consist of two difference circuits, two integrators which function as a Noise Shaping, a DAC 1-bit which produced feedback signal, a Comparator 1-bit as a quantizer followed by D flip-flop, and a pulse generator which function as a sampling circuit.

The realization of this device that have been done, produced a digital signal 64 KBps which the output follows the characteristic of the information signal with the value of measured frequency is 64,10 KHz, 4,437 Volts Peak to Peak voltage ,and 32,6 dB SNR .

Keyword : *ADC*, *Converter, Sigma, Delta, Modulator*