

## MEASUREMENT OF ANALOG SIGNAL THROUGH ADC USING XILINX SYSTEM GENERATOR

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**Abstract:** In real time applications, measurement of accurate value of analog signal through ADC provides reliable output response. For closed loop operation feedback signals are very important to obtain desired output. The feedback signal is processed through any processor and required signal is generated and the output is controlled. To obtain reliable, accurate and desired output, the feedback signal plays an important role. The analog signal is measured by AD7266, 12bit ADC using MATLAB - Xilinx system generator.

**Keywords:** Analog signal, ADC, MATLAB, Xilinx, System generator.

### 1. INTRODUCTION

When the desired output is needed for any practical system, feedback signal is required and it is processed through a digital processor. So digital signal is needed for the processor and ADC engender this work perfectly. Measuring the signal with noise is difficult and filter is used before conversion [1-2]. Using MATLAB and Simulink the digital signals are measured for communication application, electrical application, mechanical application and all other real time applications [2]. Quantization and non quantization process was developed for communication signal measurement [1]. The signals are measured in MATLAB simulink platform through 8 bit ADC. For high speed data processing is possible in FPGA processor and VHDL/Veri log coding used for measuring the analog signal. MATLAB Xilinx system generator toolbox is used to measure the analog signal. VHDL coding is used for Analog to digital conversion and bit file is generated to process the signal in FPGA. Three phase Sine wave signal and three phase non sinusoidal signal are measured in real time.

### 2. ADC unit

AD 7266 ADC is used to measure analog signal, has dual 12 bit, high speed low power, successive approximation ADC [3]. It can handle 30MHz input frequencies and voltage level is 2.7V to 5.25V. The top view of AD7266 IC is shown in fig.1. The ADC is connected to the FPGA processor through an ADD card of VSDA -03

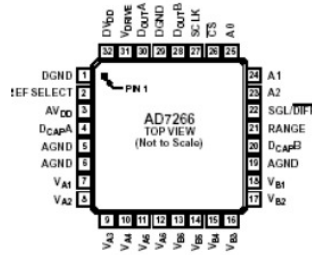


Figure 1. Pin diagram of AD 7266

3. Spartan 3A DSP and system generator

Xilinx XC3SD1800A – FG676 -4 Spartan 3A DSP FPGA is used to measure the analog signal through ADC [3]. Fig 2. shows the system generator block diagram. JTAG is the interface card connected to the PC system and FPGA board. Xilinx system generator .pad locations and counter specifications are shown in Table –I and Table – II. Figure 3. Shows the system generator specifications and Figure 4 shows the analog signal measured by ADC.

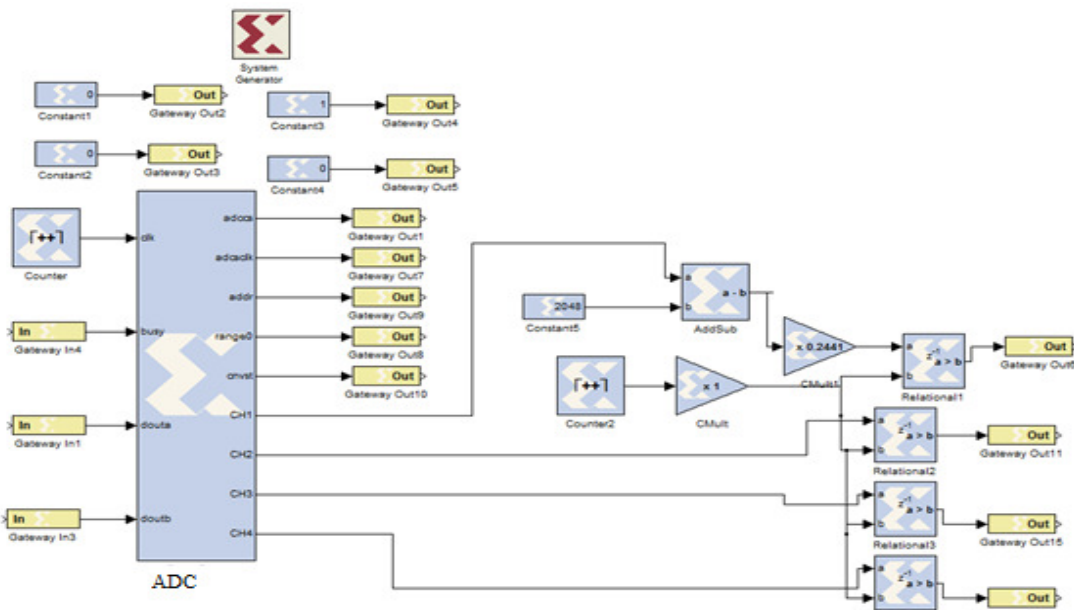


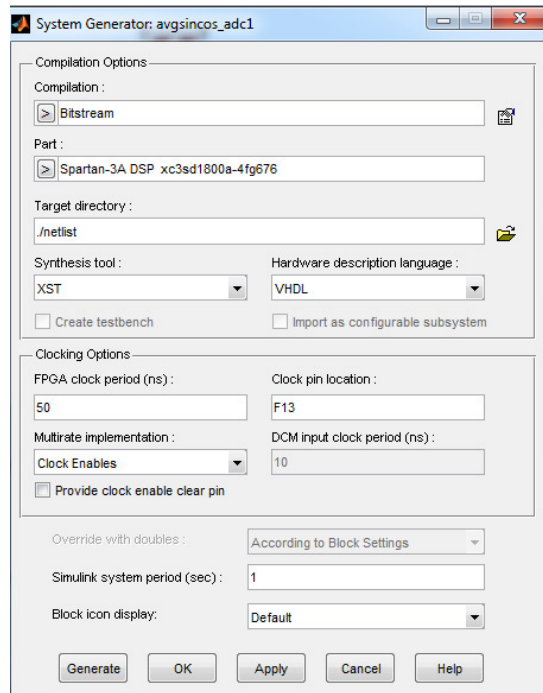
Figure 2. Simulink diagram of Analog signal measurement

**Table I:** pad locations

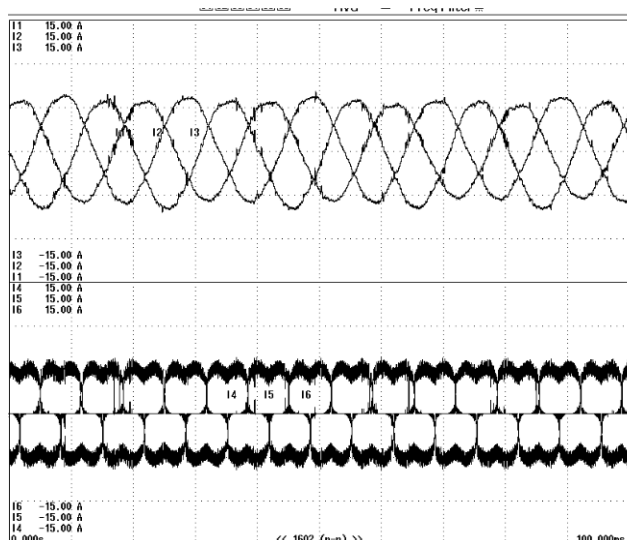
Gateway	IOB pad locations
Out1	R1
Out2	G9
Out3	D10
Out4	G6
Out5	D9
Out7	L3
Out8	F2
Out9	M1
Out10	R2
In1	M2
In3	N2
In4	P1

**Table II:** Counter specifications

Terms	Counter	Counter 2
Counter type	Count limited	Count limited
Count to value	Inf	1000
Count direction	Up	Up
Initial value	0	-1000
Step	1	1
Output type	Unsigned	Signed
Number of bits	1	13
Binary point	0	0
Explicit period	1	1



**Figure 3.** Specifications of system generator



**Figure 4.** Three phase sinusoidal signal and non sinusoidal signal measurement

#### 4. Conclusion

The three phase analog signal is measured using AD 7266 ADC through the FPGA processor. The speed of the processor is 50ns, so the data conversion is very fast and Spartan 3A DSP board has two ADC, 8 analog input is easily measured. The Xilinx tool box is used to interface processor and ADC through an ADD on card and JTAG. It is very simple and easy way to measure the analog signal through the system generator for real time applications.

#### 5. Acknowledgement

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#### References

- [1] Harold P.E. Stern, Samy A. Mahmoud, "Communication Systems Analysis and Design", pg no. 392-400
- [2] Dennis silage, "Digital communication systems using MATLAB and Simulink", pg 157 – 159, 180 -181.
- [3] XILINX SPARTAN 3A TRAINER KIT, User manual, Vi Microsystems PVT, Ltd. [www.vimicrosystems.com](http://www.vimicrosystems.com)