

INTERFACING ELECTRONIC FOR MEASUREMENT,  
SIGNAL PROCESSING AND WIRELESS  
COMMUNICATION



Edited by

Sheroz Khan, International Islamic University Malaysia

AHM Zahirul Alam, International Islamic University Malaysia

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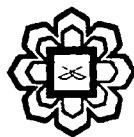
# **INTERFACING ELECTRONIC FOR MEASUREMENT, SIGNAL PROCESSING AND WIRELESS COMMUNICATION**

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## Chapter 6

### DATA CONVERSION BASIC CONCEPTS

MA LI YA, SHEROZ KHAN, ANIS NURASHIKIN

Data converter, as one kind of mixed-signal circuits, is very important and popularly used in many fundamental applications, since the physical signals in our world are mostly in analog style; however for signals' transmission and procession, digital signals are the best choice. In this chapter, we provide an overview of data conversion system, and some basic concepts.

#### 6.1. DATA CONVERSION SYSTEM

Digital signal processor (DSP) is a powerful and beneficial invention, but it only can process the signals which are discrete in time and discrete in amplitude, namely digital signals. In the real world, almost all the signals are analog which are continuous time and continuous amplitude. Therefore, data converters are necessarily used to convert the signals from analog to digital and from digital to analog again. As shown in Figure1, it is a normal mixed-signal system.

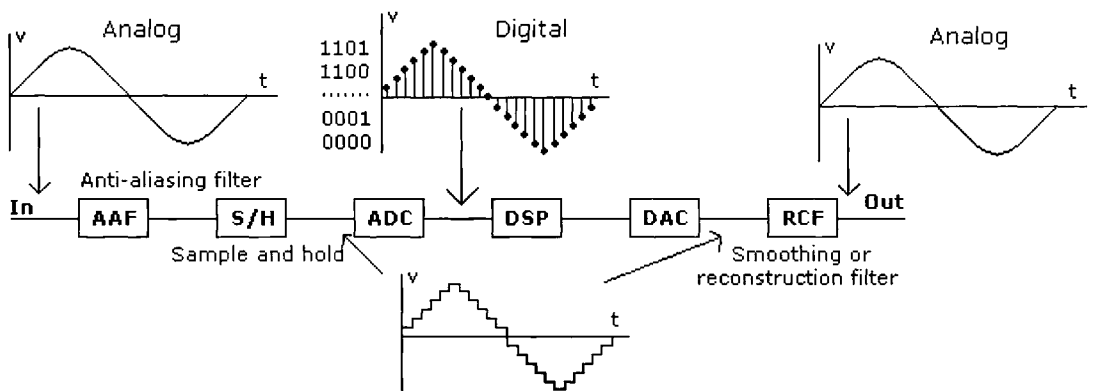


Fig. 6.1: A normal data converter system (Baker, 2009)

The system's input is analog signals which can be obtained from antenna, microphone, sensor or other applications. Input signal is applied to an analog filter, namely an anti-aliasing filter which is for limiting the input spectral content, in order to avoid aliasing when the signal is sampled and held using S/H block (Baker, 2009). The output of sample and hold circuit is connected to analog-to-digital converter (ADC), and then the digitized signal is transferred to digital signal processor (DSP) to do the computation. Using a