PRINCIPLES OF TRANSDUCER DEVICES AND COMPONENTS

Edited by

Sheroz Khan, International Islamic University Malaysia

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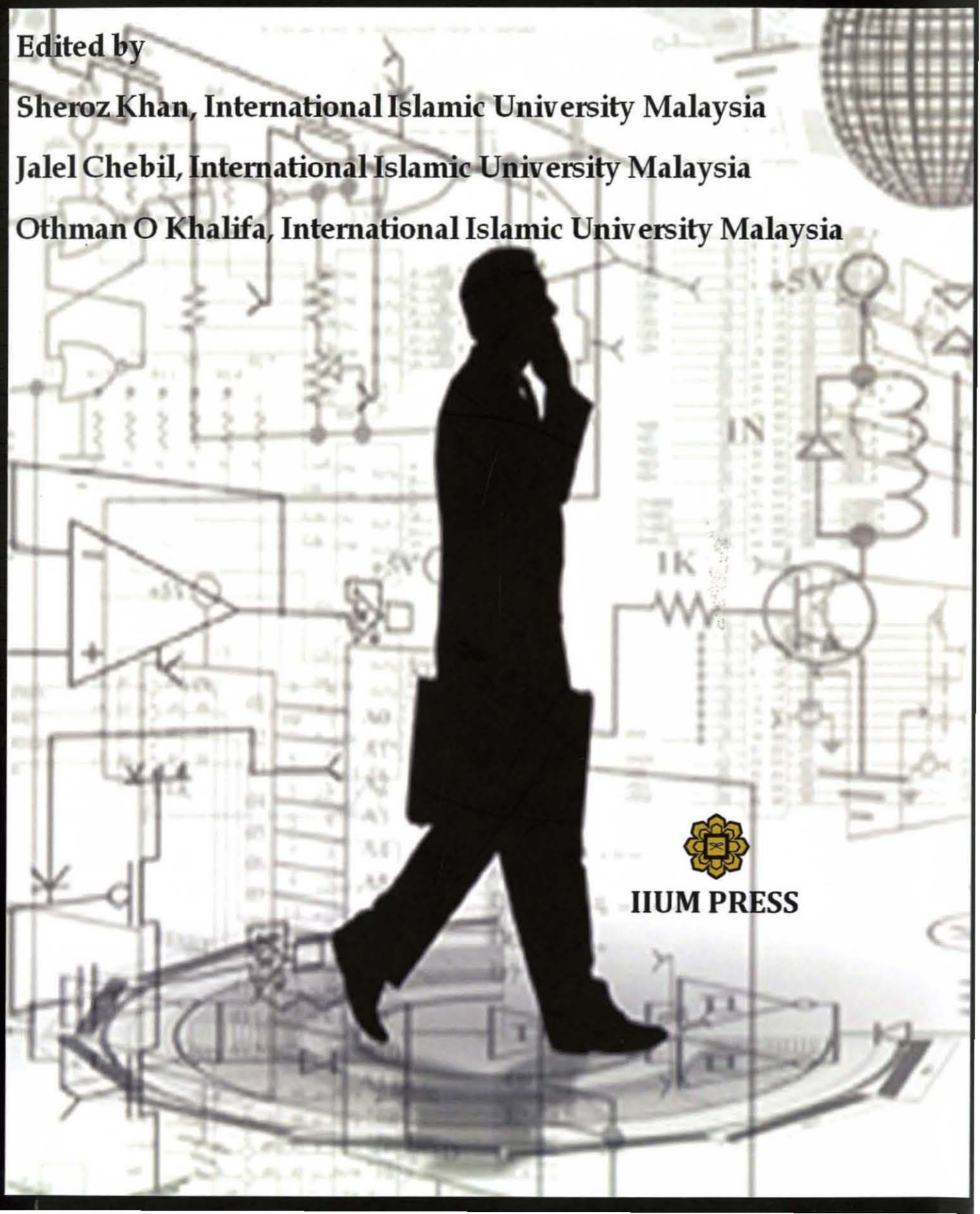

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Chapter 27

PC SOUND CARD BASED INSTRUMENTATION AND CONTROL

TEDDY SURYA GUNAWAN

27.0 INTRODUCTION

The availability of inexpensive PC sound cards that can simultaneously play and record stereo digital audio files permits a single PC or laptop or netbook to function as both a signal generator and as a dual-channel recording digital oscilloscope. This paper presents how sound card with Matlab Data Acquisition Toolbox can be utilized for instrumentation and control. The buffer hardware circuit or signal conditioning circuit is developed and implemented to enable sound card to be functioned like oscilloscope. Preliminary results showed that sound card with the developed software has a good potential for instrumentation and control.

Nowadays, every computer has a built-in sound card. Sound cards are usually treated as an audio input and output devices for recording, synthesizing, and replaying speech, music and songs. The availability of inexpensive PC sound cards that can simultaneously play and record stereo digital audio files permits a single PC or laptop or netbook to function as both a signal generator and as a dual-channel recording digital oscilloscope [1].

A PC sound card traditionally is used for acquisition of sound. Many applications have been derived, such as computer audiometer [2], study of heart and lung sound to acquire better auscultation results [3], heart sound database [4], and elderly care by sound classification [5,6]. Sound card has been used also for practical experiment in education system, such as circuits and communications experiments [7], near real time processing [8] and communication lab [9]. Apart from traditional use of sound card, the sound card capability has been used for many other applications. For example, Azooz [10] has utilized the inexpensive PC sound card with Matlab for obtaining I-V characteristics of electronic components. Ramirez [11] used sound card with proper sound conditioning circuit for acquiring corneal electrical signals. Recently, Hossain [12] used sound card to implement sun tracking control system, in which two sound cards were used to control panning and tilt.

Although many research have been initiated to utilize the sound card, however not many studies have been focusing on using the sound card for control and instrumentation. Therefore, the objective of this chapter were to extensively study the feasibility of using sound card with Matlab for instrumentation and control and to develop and implement a buffer hardware circuit for interfacing the sound card so that it can be functioned like an