

PRINCIPLES OF TRANSDUCER DEVICES AND COMPONENTS

Edited by

Sheroz Khan, International Islamic University Malaysia

Jalel Chebil, International Islamic University Malaysia

Othman O Khalifa, International Islamic University Malaysia



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EMAIL: iiumprinting@yahoo.com

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Chapter 31

TRANSDUCERS-TO-MICROCONTROLLER INTERFACES- SOFTWARE SOLUTION APPROACH

LAWAL WAHAB ADETUNJI, SALAMI FEMI ABDULAZIZ, SHEROZ KHAN,
AHM ZAHIRUL ALAM, MOHAMMAD RAFIQL ISLAM, SHIHAB A. HAMEED
AND AISHA HASAN ABDALLA

31.0 INTRODUCTION

Health interfacing circuits serves as platforms through which data signals are passed from one acquisition or processing stage to another. The purpose of these platforms vary and could be for the purpose of eliminating some signal components that are not required in the content of data that is moved onward or for the purpose of squeezing an out of range signal into what is said to be within the safe range of the upcoming stage of processing. Interfacing devices could also be a chain of electronic components providing a preliminary stage of processing or decision required for making a processor or plant to start and stop some onward control activities.

Although, this article is about basically an elaboration of an ages-old electronics, but it has got its relevance in the face of the on-going transition from coarse to fine-tuned system requirements. We start discussing on an account of such devices and circuits with the help of theoretical support from the basic concepts going a bit into their applications and where they suffer degradation. This performance degradation may arise as a result of the delay caused by the extra interfacing circuitry. Interference issues also arise when unacceptable levels of spikes are introduced by the interfacing circuit or when undesirable oscillations get coupled with the power supply and clock of the digital system the interfacing is busy serving it.

Whilst this was not regarded as an issue worthy of eminent attention some time ago, the delay caused and the interference levels are issues being tried to be addressed viz-a-viz the standard of measurement required for today's finely tuned measurement and control applications. The signal inaccuracy has become another important issue in recent researches when a signal derived from a transducer is exhibiting a nonlinear pattern as function of the parameter of interest, which is the case in most of the transducers used in today's applications.

The nonlinearity issue and the inaccuracies that its causes, is reported in this article; the techniques currently in use for tackling these inaccuracies are reported in simple understandable terms and presentation. In the article we will be addressing the need of reducing the interfacing chain and its effect as power supply interference besides the