



Computer Interfacing and Automation: Hardware, Firmware and Software Design: Theory and Practice

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About the Book

Instrumentation and Computer Control course is specially designed to make the scientists and engineers capable of interfacing an experimental setup, automate the setup by computer controls, the book is unique in its treatment of the subject in terms of coverage and approach.

The book adopts a "learning through doing" approach. Each chapter deals with a major topic in computer control system design related to hardware, firmware and software. The chapters proceed as a series of practical experiments the reader sets up a simple hardware system, develops and downloads a simple program, and immediately observes and tests the outcome. The book then reflects on the experimental results, evaluating the strengths and weaknesses of the technology or technique introduced, explores how precise the link is between theory and practice, and considers scaling up the applications in the wider context. This is one of a few books that explains how to automate a lab, industry etc., using own proprietary or commercially made instruments using hardware, firmware and software.

The book can be used by automation engineers in the industry, physicists working in an experimental setup, embedded system engineers and students who are interested in PC interfacing projects. Every chapter includes all the interfacing buses, hardware firmware and software design.

Salient Features

Hands-on introduction to the field of microcontroller interfacing, PC interfacing, automation, computer controls, and sensor data acquisition

Focuses on fast prototyping of hardware, firmware and software for control and data acquisition

Covers all latest basic embedded system concepts, through simple and effective experimentation

Gives an understanding of ARM and ATMEL technology and interfacing, and their use in the world's leading technology companies

□ Contains a practical introduction to embedded firmware programming using C++ basics

Develops interfacing GUI using Visual Basic, Qt and LabVIEW

Introduces:

interfacing standards like RS232, GPIB, PLC Modbus, SCADA, CAMAC and VME;

protocols like http, RPC, SPI etc., and techniques like PID using Ethernet-based embedded web clients;

the network analysis tool "wireshark"; and

interfacing of PLC, VFD, HMI, CAN, ETHERNET, and USB

Combines the ARM mbed technology with a simple low cost "breadboard" approach for simplifying applications

All key concepts are covered through simple and effective experimentation

Table of Contents

1. RS-232 Serial Communication
2. LabVIEW programming basics for control GUI design
3. Microcontroller based embedded Design: Hardware Engineering
4. Proportional Integral Derivative (PID)
5. Data Logging and Supervisory Control (DSC) via RS485 Modbus using LabVIEW
6. Scada Using wonderware intouch
7. Programable Logic Controllers hmi and Variable Frequency Drives (PLC and VFD)
8. C++ for any design: lay strong foundation first
9. Firmware using ARM mbed Micro controller & cloud compiler
10. GUI designs Using Qt A C++ tool kit
11. Introduction to web Automation basics, h/w Accessories
12. Computer Automated Measurement and Control (CAMAC) & vme bus
13. Field-Programmable Gate Arrays (FPGAs)
14. General purpose Interface Bus (GPIB)

15. Webserver and Interfacing: A Web I/O Server
 16. Wireshark for network analysis
 17. Microcontroller based Ethernet HTTP Clients and Interfacing
 18. Controller-Area Network (CAN)
 19. Labview Fpga Real Time & cRio Interfacing
 20. Android App Inventor & Interfacing
 21. Internet of Things (IoT) & Interfacing
 22. Real-time Digital Filtering Using The LPC1768 ARM Cortex-M3 Microcontroller
- Appendix: Practice Python Script for Interfacing
Index.
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About the Author

Joby Antony :- is Engineer-F at Inter University Accelerator Centre(Formerly Nuclear Science Centre). He has more than 25 years' experience in working with Interfacing, Automation and Computer Controls (IAUC). He has his Bachelor of Engineering degree in Electronics and Communication Engineering from Faculty of Engineering &Technology, JMI, New Delhi with a first rank and he has done his Master's degree in Electronics & Computer Technology from Kent State University, Ohio, USA. He has also done his Ph.D from IIT (ISM) Dhanbad. He has been a Visiting Scientist to CERN, Geneva (European Centre of Nuclear Research where WEB was born) during the commissioning of Large Hadron Collider Instrumentation in 2004 and later in 2014. He is currently the in charge of Electronics for Cryogenics at IUAC.