

PRACTICAL TROUBLESHOOTING OF DATA ACQUISITION AND SCADA SYSTEMS



YOU WILL LEARN HOW TO:

- Install and configure a data acquisition system
- Choose and configure the correct software
- Apply state of the art approaches in design of data acquisition systems
- Configure data communications systems
- Avoid the common pitfalls in designing a data acquisition system

WHO SHOULD ATTEND:

- Electronic Engineers
- Instrumentation and Control System Engineers
- Electrical Engineers
- Project Engineers
- Design Engineers
- Technicians
- Process Control Engineers
- Systems Engineers



The Workshop

This two-day workshop covers all aspects of data acquisition and control using a PC and data loggers, including design, specification, programming, installation and configuration.

Both the novice and experienced user will gain a solid grasp of the principles and practical implementation of interfacing the PC and standalone instruments to real world signals. Upon completion of the workshop you will have a thorough understanding of PC based data acquisition systems and will be able to design, specify, install, configure and program data acquisition systems quickly and effectively. In addition, the workshop aims to cover the industrial communications standards that are used with instruments today.

Aims

Personal computers have become a popular and affordable platform from which to perform data acquisition and control for a variety of industrial and scientific applications. Data acquisition with the PC enables one to log and control a variety of real world signals such as pressure, flow and temperature and to interface to various standalone instruments.

This practical workshop will equip you with the knowledge and expertise to configure an efficient and effective data acquisition and control system using a PC and standalone instruments. You will learn various simple approaches to the design of data acquisition systems and choice of software, hardware and analysis tools.

The Program

INTRODUCTION

- Data acquisition and control
- Fundamental principles of data acquisition and control systems
- Typical PC based applications

ANALOG AND DIGITAL SIGNALS

- Sensors, transducers and temperature transducers
- Strain gauges
- The difference between single ended and differential systems
- Earthing and isolation techniques to reduce noise
- Cable shielding and earthing

SIGNAL CONDITIONING

- The different types of signal conditioners
- Signal conditioning functions and signal filtering
- Isolation and over voltage protection

THE PC FOR REAL TIME WORK

- The different data transfer methods
- Streaming of data to hard disk

PLUG IN DATA ACQUISITION BOARDS

- Typical analogue to digital (A/D) boards
- Single ended vs differential signals
- Analogue to digital (A/D) board specifications
- Capturing high speed transient data
- Principles of data sampling
- Speed vs throughput of data
- Typical digital to analogue (D/A) boards
- Input/Output (I/O) boards
- Counter/timer I/O boards
- Practical considerations with use of digital I/O boards

RS-232/RS-485 SERIAL DATA COMMUNICATIONS STANDARDS

- RS-232 hardware interface
- Principles of RS-232 handshaking
- RS-485 hardware interface
- Communication protocols (e.g. Modbus)
- Error detection
- Troubleshooting serial data communications systems

CONTROLLERS AND DATA LOGGERS

- Hardware structure of standalone devices
- Practical applications of data loggers
- How to improve communication bottlenecks IEEE-488 SYSTEMS
- IEEE-488.1/IEEE-488.2 and SCPI specifications
- Hardware configuration
- Device types (controllers/listeners/talkers)
- Basic communications
- Advanced communications

INDUSTRIAL ETHERNET AND TCP/IP

- Configuring an Ethernet system
- Troubleshooting TCP/IP and Ethernet
- Connecting Ethernet based instruments and data loggers to a PC
- Tips and tricks with Ethernet

UNIVERSAL SERIAL BUS (USB)

- Concept and practice
- USB explained
- Benefits for data acquisition and communications

REVIEW OF THE COURSE AND QUESTIONS

Practical Sessions

Groups of attendees will be allocated a PC to develop simulated Data Acquisition and SCADA software projects. You will use internationally known software packages, chosen for their high profile and popularity in the industrial environment. You will put these software programs to the test, developing your ability to understand DAQ systems and reinforcing the information learnt in the workshop.

Learn how to use real SCADA software

The SCADA software used is industry standard DAQ software preferred by factories and plants around the world and is designed for large-scale sites. You will design a simulated project and learn first-hand how to set up and use the software to build a complete factory SCADA system.

Learn how to use real Data Acquisition software

The Labview data acquisition software is an industry standard package used for small to medium scale industrial systems. You will develop a simulated tank to pump data acquisition system on the PC. Through designing this simple virtual system, you will receive an understanding of the use and limitations of data acquisition software packages like Labview.

Learn how to set up and acquire data using real hardware

As a bonus you will have the opportunity to see how a data acquisition device is set up and used. You will configure the data logger, read real inputs and analyse the information.

Learn the basic tips in troubleshooting RS-485, Ethernet and TCP/IP

Connect up an Ethernet based instrument/logger and troubleshooting typical problems

To gain full value from this workshop, please bring your laptop/notebook computer.

