6

Conclusion and Future Scope

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6.1 General Conclusion

The present work has been concentrated on the design and development of both hardwares and softwares for cost effective data acquisition system (DAS), which are used for measuring slowly varying physical variables. Physical parameters such as temperature, humidity, light intensity etc., which are generally considered as slowly varying signals, are measured by the designed DAS. Design consideration of the PC based data acquisition system has been made, based on commonly available ports of the personal computers (PCs) viz. parallel port, serial port and USB (Universal Serial Bus).

Simple cost effective methods and techniques have been proposed for the design and development of PC based DAS for measuring some physical parameters. They are

1. Design and development of parallel port, serial port (RS 232) and USB based DAS. It includes the hardware design i.e. PCB design and fabrication for circuits like power supply, clock generator, signal conditioner and DAS.

2. For serial port (RS 232) based DAS, it uses PIC12F675 microcontroller and for USB it uses PIC18F4550 microcontroller. It has built-in 10 bit resolution ADC. For proper functioning of the device, firmwares have been developed using ‘C’.

3. Application programs for communication with the designed H/W have been developed using ‘C’, and Visual Basic. Observations were taken using the temperature and humidity sensors.

The design and development of the parallel port based DAS has been described in Chapter 3. It includes the design and fabrication of the hardware, development of the application program to communicate with the designed hardware (H/W). It has 8 bit resolution. Application programs are developed in Turbo C, Visual Basic and also tested using LabVIEW. Application program written in Turbo C can be used in Windows 95, 98, 98SE, Me only and not in later versions. Observations have been taken for measuring temperature, humidity and light intensities [1].
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In Chapter 4, the method and technique for design and development of the serial port (RS 232) based DAS have been described. It includes the design and fabrication of the hardware, development of the firmware and application program to communicate with the designed H/W. It uses PIC12F675 microcontroller. It has 10 bit resolution. Firmware is written in 'C'. Application programs have been developed in Turbo C, Visual Basic. Application program written in Turbo C can be used in Windows 95, 98, 98SE, Me and XP but not in later versions. Observations have been taken using the temperature and humidity sensors [2, 3].

In Chapter 5, the design and development of the USB based DAS have been described. It includes the design and fabrication of the hardware, development of the firmware and application program to communicate with the designed H/W. It uses PIC18F4550 microcontroller. It has 10 bit resolution. Firmware is written in 'C'. Application program has been developed in Visual Basic. Observations have been taken using the temperature and humidity sensors [4].

Our systems, designed with commonly available electronic components, so called hardware; as well as the developed programs, so called software, have worked satisfactorily for recording the physical parameters in real time with graphical display and storing the records to the hard disk of the PC.

In this concluding Chapter, we summarize our studies on a few "real-time" data acquisition systems based on IBM PC platforms. This field has been changing continuously with the improvement of technology, electronics and its applications in various instrumentation systems; resulting with new products, standards, and approaches appearing continuously. The field of PCs and PC based system design will continue to evolve at its typically frenetic pace. Desktop PCs are likely to become black boxes without any internal expansion slots and rely solely on standard ports, such as USB and Fire Wire [5]. Industrial and embedded PCs may become the platforms of choice for data acquisition systems because of their flexible hardware expansion capabilities. In the field of sensors, integrating more functions and "intelligence" in sensor units should continue. Growing acceptance of the Smart Transducer Interface Standards i.e. IEEE 1451 standards will also help to accelerate this trend.
Most of the researchers are working in the development of softwares related to the readymade hardwares. The present work is in the design and development of both the hardwares and softwares for cost effective design, and also for measuring slowly varying physical variables. These DAS will be useful in the laboratories, factories and industries. In the present work, the design are made so as to make them compatible in both new and legacy hardware(s) for desktop and laptops.

6.2 Future Scope of the Work

The present work is focused around the design and development of cost effective PC based data acquisition system (DAS), both hardwares and softwares. The designed systems are having 10-bit resolution only. Resolution can be further increased by using high resolution external ADCs. To make the designed system more flexible with better performance, the following modifications can be made

i ADC : ADC’s resolution can be increased by selecting high resolution ADCs,

ii Microcontroller : selection of advanced version of microcontroller for higher speed, resolution and better performance,

iii Sensor : selection of high quality sensors, integrated or smart sensors to get faster response speed with higher resolution and better performance,

iv Hardware and software : hardware and software modifications to enable long distance acquisition, remote access (wired and wireless) etc.,

v Miniaturization : Miniaturization of the designed system by using surface mount devices (SMD components).

Then, the scope and applicability of the designed system will be increased. It can be used for the applications in various fields in physics, chemistry, life sciences, engineering, medical, geological applications etc.
REFERENCES


