SINGLE INPUT VIRTUAL DIGITAL MULTI-METER
DESIGN AND IMPLEMENTATION

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ABSTRACT. In this research, a single measurement input virtual digital multi-meter is designed and constructed. It consists of three major works: (1) Software design, (2) Measurement circuit design, (3) System integration. This digital multi-meter is made by software part, Labview hardware part, DAQ card and external measurement circuits which are designed by two logic IC’s. The measurement functions include (1) DC voltage, (2) AC voltage, (3) DC current, (4), AC current, (5) Resistance, (6) Capacitance, (7) Inductance, (8) Diode test, (9) Audio continuity. The illustrations demonstrate the design of the front panels and proceed with the measurement test of the designed single input virtual digital multi-meter to show the capabilities.

Keywords: Virtual instrument, Multi-meter, Design, Implementation, Labview

1. Introduction. In recent years, with the extensive use of the personal computer (PC), the interest in heuristic applications regarding software tools for developing virtual instruments (VI) has increased steadily. This interest is mainly because the cost of research and development can be reduced and the development speed can be accelerated. One of the most attractive facts is a well-developed VI can be considered a software IC and then be used to design a large-scale or complicated system. The reuse of the existed VIs makes developing a new VI easier. For these reasons, many computer languages are designed to overcome the difficulties between the connections of controlled hardware, software and the different operating systems.

Virtual instrumentation using a computer screen as a front panel of a physical instrument is today a common point that has dramatically changed the concept of traditional instrumentation. Buttons, knobs and signal windows can be operated in a similar way. The hardware behind the panel may vary widely, from a simple PC with a plugged in card, to a sophisticated VXI mainframe incorporating powerful cards [1]. Also, the instruments can be interconnected through a standard bus to create a very complex instrument [2-6]. They are concurrent programming, graphical user interface (GUI), real-time system, object oriented program and object oriented technology. Currently, there are several systems for developing the virtual instrument such as LabVIEW, Look-Out, BridgeVIEW and LabWindows/CVI [7].

From these computer languages, LabVIEW (Laboratory Virtual Instrument Engineering Workbench) is a data-flow- and graphic-based language; this language is very suitable for designing a man-machine interface. LabVIEW interacts with the users in two separate forms: (1) block diagrams, where the data flow and control function can be designed; and (2) front panel, in which switches, counters and graphs can be displayed and accessed by