

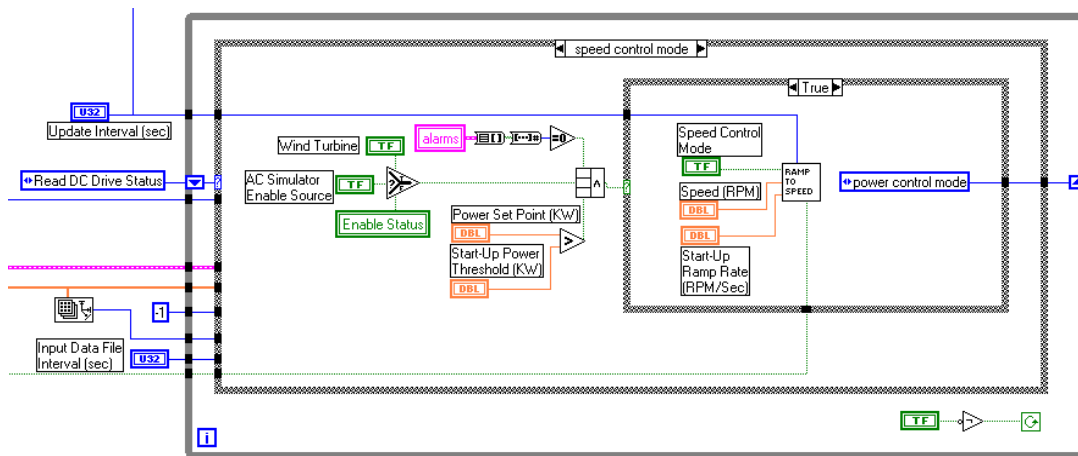
The Problem:

Provide computer control and data acquisition of a system designed to evaluate hybrid power systems. Hybrid power systems are typically used in remote areas and combine multiple power sources such as wind turbines, photovoltaic arrays, diesel generators, and battery storage systems. The system was designed such that three hybrid power systems can be tested simultaneously and can use either real or simulated renewable energy sources, simulate a local electric grid, test with real or simulated village loads, and test wind turbine systems producing direct or alternating current.

The Solution:

Using LabVIEW's built in TCP/IP functions for communicating across a local area network, a client/server architecture was designed with a single data server computer performing continuous data acquisition on a number of AC and DC current and voltage transducers. Client computers will monitor one of three hybrid power systems as they request specific channels from the server. Besides allowing multiple users to access a single data acquisition system, the data acquisition can be done at a higher data rate than if the same program was needed for data logging and display requirements. In addition to the data acquisition and data logging/display programs, two other LabVIEW programs were written. One is for the control of a village load simulator with both real and inductive elements and the program permits the operator to set parameters in real time or from a file. The other program is for control of an AC wind turbine simulator. It interfaces to a DC motor that drives an AC induction generator. Power output can be a manual selection, from a file, or from real time measured wind speed converted to power based on a power curve of a wind turbine.

Available to all U.S. companies involved in hybrid power systems, the test bed's hardware and software allows for low cost, reliable, and repeatable evaluations of existing and future renewable energy sources.



Hardware Used:

National Instruments AT-MIO-16E
National Instruments SCXI
National Instruments 6B Series

Software Used:

National Instruments LabVIEW