Delta 28SV PLC System Enhancement: Integrated AIO/DIO Module Implementation with MODBUSLabVIEW RT Communication for Advanced DAC Control

Abstract

This work is for comprehensive enhancement of a Delta 28SV PLC-based instrumentation system through strategic hardware expansion and software optimisation within an existing Data Acquisition and Control (DAC) framework. The upgrade incorporates additional Analog Input/Output (AIO) and Digital Input/Output (DIO) modules to significantly expand monitoring and control capabilities. Custom ladder programming has been developed to efficiently manage the enhanced I/O configuration while implementing robust MODBUS RTU or TCP/IP communication protocols for seamless real-time integration with LabVIEW RT software. The modernized architecture provides enhanced signal acquisition precision, expanded control functionality and reliable bidirectional communication between the PLC platform and LabVIEW RT environment. Performance validation demonstrates substantial improvements in system responsiveness, control accuracy and operational flexibility while ensuring full backward compatibility with existing DAC control infrastructure. The integrated solution delivers a cost-effective, scalable platform that meets evolving operational requirements while maintaining system reliability and ease of maintenance.

Hardware Components:
? Delta 28SV PLC platform
? AIO (Analog Input/Output) modules
? DIO (Digital Input/Output) modules
? Enhanced I/O expansion capabilities

Software Development:
? Custom ladder programming
? MODBUS TCP/IP communication protocols
? LabVIEW RT interface development
? Real-time data exchange implementation

Academic Project Requirements:

1) Required No. of student(s) for academic project: 2

2) Name of course with branch/discipline: B.E./B.Tech. Electronics and Instrumentation Engineering

3) Academic Project duration:

(a) Total academic project duration: 26 Weeks
(b) Student's presence at IPR for academic project work: 5 Full working Days per week

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