



## **Modicon Quantum Controller Intermediate I Programming & Troubleshooting Module 102**

The Intermediate I course increases your ability to maintain and troubleshoot your automation system. In the first course, you learned hardware and software configuration and basic programming (using relays, timers, counters, and the calculate functions). You learned how to modify and troubleshoot using these program elements. Present day automation programs are contrived of a combination of relays, timers, and counters with operations involving registers, and the bits within data storage locations. The Intermediate I course will explore the word instruction blocks, i.e., Table - Register, Block, First In First Out Queues etc. Programs using these techniques include data gathering, calculations, date and time stamping, shift registers, data concentration, totalizing, averaging, etc. You will learn to trace the control flow of register information into, through, and out of logic programs using register manipulation techniques. This knowledge will provide you the basis from which to comprehend complicated automation control circuits, use the system diagnostics more competently, and help you diagnose and solve in-plant control problems more quickly. This is a four (4) day course. Prerequisite: Modicon Quantum/984 Maintenance & Troubleshooting or instructor approval.

### **Course Objectives**

- Brief review of the major functional components of the Modicon programmable controller system.
- Review relay ladder logic, timers, counters, and calculate function blocks.
- Explore and test the functionality of, data move function blocks as they apply to information transferred into and out of your programmable logic controller.
- Develop programs that will explore your knowledge and understanding of the function blocks associated with register, word manipulations.
- Apply these programming skills and knowledge to troubleshoot application specific sub-programs selected from your own automation system.
- Develop methods to test and examine program anomalies, by creating logic software traps, that allow the PAC to monitor the flow of information through a series of control function blocks.
- Explore and test the functionality of the data move function blocks as they apply to transferring information into and out of your programmable logic controller.
- Apply troubleshooting techniques using the programming software as a diagnostic
- Develop diagnostic skills to determine and isolate whether the problem is hardware, software, or field device related?
- Is the circuit off? Discuss appropriate safety issues.