

“OpenControl Programming - GM”

(HMI/SCADA Course #T-OCGM1)

Course Duration: Four days (normally Tuesday through Friday) 8:30 through 4:30

Course Location: Ann Arbor, Michigan

Course Overview

The purpose of this course is to provide students with a basic understanding of the tools available, and design methods used, when developing OpenControl projects adhering to the specifications required by General Motors Powertrain. The students will also be taught methods of utilizing Paragon HMI software template screens to create HMI screens for GM Powertrain projects. Profibus communications between OpenControl and hardware I/O and other OpenControl PCs will also be covered.

Objectives

At the conclusion of this course, the student should be able to reference the GM specification and utilize GM Powertrain template flowcharts and HMI template screens to automate machinery, connect to hardware via Profibus, Import and Export OpenControl projects, Troubleshoot OpenControl Charts, Profibus addressing and Paragon screens.

Prerequisites

Students are required to have a working knowledge of:
Windows NT or 95 operating system.
Windows NT or 95 Explorer.
Past experience with a control software package (ladder or flowchart) will be helpful.

Audience

The target audience consists of Control Engineers from OEM's, suppliers, and GM employees involved with GM Powertrain programs.

Course Outline

The course is designed utilizing step-by-step hands-on labs while covering the following subjects (one computer per student):

- | | | |
|--|---|---|
| <p>1 Open Control Introduction</p> <ul style="list-style-type: none"> • OpenControl Tips • Starting OpenControl from Paragon/Creating Paragon Icon • Demonstration of OpenControl using Parking Garage Project • Creating a Functional Flowchart • OpenControl Monitor Debugger • Open Control Files | <p>3 GM Powertrain Project Steps</p> <ul style="list-style-type: none"> • Doughnut Factory Project & Six Project Steps • Describe Automation Step • Develop Functional Flowchart Step • Control Program Development Step • Edit and Debug Flowcharts Step • System Runoff Step • Flowchart Organization Considerations | <ul style="list-style-type: none"> • GMPTG Automatic Operation States • GMPTG Overall Status Flowchart • GMPTG Level 1, 2 and 3 Fault Checking Flowchart • GMPTG Reset Flowcharts |
| <p>2 Open Control Basics</p> <ul style="list-style-type: none"> • Types of Logic Memory • GMPTG Naming Conventions • Profibus Introduction/Demo • Flowcharting Elements (Terminal, Condition and Process Blocks) • Process Block (General Commands) • Block Transfer • Condition Blocks • Process Block (Timer Commands) • Process Block (String Commands) • Function SubCharts • Other Tools • Functional Description of OpenControl Monitor | <p>4 GMPTG Flowchart Methodology</p> <ul style="list-style-type: none"> • GMPTG Template Charts Project • GMPTG <Name>_Auto_Cycle Flowchart • GMPTG <Name>_Control_Outputs Flowchart • GMPTG Sub-Chart Flowcharts • GMPTG Output/Event Control Using Sub-Charts • GMPTG <Name>_Status Flowchart • GMPTG <Name>_Recovery Flowchart • GMPTG Mode Selection Flowchart • GMPTG Automatic Cycle of the Machine | <p>5 Paragon/GMPTG HMI Screens</p> <ul style="list-style-type: none"> • Introduction • Installation/Setup • Operator Interface • ICC FrameBuilder • Running Application |
| | | <p>6 Class Handouts Covered:</p> <ul style="list-style-type: none"> • GMPTG Template Charts • Paragon GMPTG Library Users Guide • GMPTG HMI Screen Descriptions • Paragon Security Setup Guide • Profibus Installation and Configuration • Profibus Cabling Guidelines • Interfacing Visual Basic to OpenControl • GMPTG Machine Operations & Flowcharting Control Specification |