SMLC Advanced Training Content
Detail

1 Prerequisites - Initial self-test

1.1 Completion of the Introductory SMLC Training, or equivalent IEC-61131-3 experience

1.2 Familiarity with SWPro, including Monitor, Upgrading SMLC and Drive Firmware, Data Logging

1.3 Familiarity with the CoDeSys IDE, including Project | Options choices; handling a boot project and source download/upload

1.4 Familiarity with selected motion topics in the SMLC Help table of contents:

Motion Overview	Gear Overview	Move Overview
Cam Overview	Profile Overview	PLS Overview

2 Using the Help system – discussed initially and used throughout

2.1 Combination of CoDeSys Help and SMLC Help, using common files, index, etc.

2.2 Review 3S directory structure

3 Program Organization – Structure Choices

3.1 Programming Guidelines – How are applications approached

3.2 Simplified State Machine SMLC_Example

3.3 PLC centric applications

3.4 Motion centric applications

4 Tuning

4.1 Loop rate discussion

4.2 Tuning presentation [PPT]

4.3 Position, Velocity, and Current Loop review

4.4 Tension Loop Mode

4.5 Exercise – Tuning of Demo motors

5 PLC Configuration

5.1 HMI Configuration

5.2 Virtual Modbus PLC

5.3 Modbus register discussion

5.4 SMLC I/O

5.5 Wago or other external I/O

5.6 Export / Import of configuration info

5.7 Using Drive I/O [not a part of PLC Config]

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6 Communications

- 6.1 General considerations / Clients / Servers
- 6.2 Using SWPro to configure IP addresses on SMLCs
- 6.3 Ethernet Overview: Cables, Hubs, PC Setup
- 6.4 Ethernet Troubleshooting
- 6.5 FTP Access to SMLCs
- 6.6 Remote Access to SMLCs via modem
- 6.7 Modbus/TCP, Ethernet IP, Sockets
- 6.8 Tutorials: Profibus, Wago, HMI, Festo, OPC

7 Debug Tools and Methods

- 7.1 PLC Browser
- 7.2 Error Log
- 7.3 Watch Window
- 7.4 Sampling Trace
- 7.5 Using a visualization to show motion states

8 ORMEC Libraries

- 8.1 Libraries installed by default
- 8.2 Optional additional ORMEC libraries
- 8.3 Exercise: Use to show SMLC Firmware Version on HMI [Visualization]
- 8.4 Exercise: Use to show drive info on HMI [Visualization]

9 Data Structures

- 9.1 Review O_ constants and OP_ parameters
- 9.2 Data structure discussion
- 9.3 Use a visualization [in section 11] to see the contents of the structure
- 9.4 Data structures in Rotary Knife AFB

10 Building Functions and Function Blocks

- 10.1 When to create your own Functions and Function Blocks
- 10.2 How to create your own Functions and Function Blocks
- 10.3 Use "SMLC_User_Defined_Functions_and_ Function_Blocks.pdf" tutorial as a starting point.
- 10.4 Provide examples in LD, ST, and SFC
- 10.5 Use of SFC Reset

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11 Application Specific Function Blocks

11.1 Rotary Knife is used as an example AFB

11.2 Show how the AFB is incorporated, and review data structures used

11.3 Exercise: Run the Rotary Knife demo project

11.4 Review how the AFB was developed and tested

12 Programmable Limit Switches

12.1 Compare with PLCopen Digital Cam Switches

12.2 Review the OrmLibPLS

12.3 Timing Diagrams

12.4 Using OrmPLS to Start or Stop motions

12.5 OrmHandle

12.6 Demo an example PLS project

13 Motion Queues

13.1 Overview of queued motion

13.2 O_QUE in both Help and the SMLC Library

13.3 General motion discussion

13.4 Motion State Diagram

14 Cams and Gearing

14.1 Publishing master axis or pacer info for follower axes to use

14.2 Exercise: cam example

15 Putting it all together

15.1 Creating a control program