

IEC 61131-3 Product Training

Telemetry & Remote SCADA Solutions

IEC-61131-3 Programming and SCADAPack Controller
Three Day Training Session

Table of Contents

TABLE OF CONTENTS	I
TRAINING COURSE OVERVIEW	1
SCADAPack Controller Hardware.....	1
Series 5000 I/O Modules.....	1
IEC61131 Programming Overview.....	1
ISaGRAF Workbench overview	1
Ladder Diagram Language	2
Function Block Diagram Language.....	2
Structured Text language.....	2
Sequential Function Chart Language	2
Communication Protocols and ISaGRAF	2
Notes	2
TRAINING COURSE SCHEDULE	3
Day One	3
Day Two	3
Day Three.....	3

Training Course Overview

This 3-day course is designed to give each participant a detailed introduction to the SCADAPack controller hardware, 5000 Series I/O modules and ISaGRAF IEC-61131 programming. The knowledge gained from this course will enable the participants to successfully program and use the SCADAPack controller in a wide variety of SCADA, process control and telemetry applications.

This training session is developed with a hands on approach to learning. Participants are guided, using demonstrations and exercises, through the development of a project that will include the IEC_61131 programming languages.

SCADAPack Controller Hardware

An overview of the installation, operation and maintenance of the SCADAPack Controller. All hardware aspects of the SCADAPack controller will be explained to give the participant a detailed knowledge of the features of the SCADAPack controller.

Series 5000 I/O Modules

Addressing and configuring Series 5000 I/O modules used with the SCADAPack is explained. The types of modules available and their application in telemetry or SCADA systems are presented.

IEC61131 Programming Overview

An overview of selected IEC-61131 programming languages is presented. Each language, and its relationship to other languages in the programming environment, is presented. Programs are developed using the following languages:

- Sequential Function Chart (SFC)
- Functional Block Diagram (FBD)
- Ladder Diagram (LD)
- Structured Text (ST)

ISaGRAF Workbench overview

A thorough tour of the ISaGRAF IEC-61131 programming environment is presented. The programming environment architecture is explained and developed to demonstrate the steps required to create a project. Using the Workbench to establish a connection with a SCADAPack controller. The created project is used through out the training session as programs created in the IEC-61131 programming Languages are added to the project.

Ladder Diagram Language

Ladder Diagram is a graphic language combining contacts and coils to build logical discrete control procedures. This language is identical to the relay ladder logic used by most programmable Logic Controllers. The Ladder Diagram editor is explained and then a simple Ladder Diagram program is created developing the ideas of the variable dictionary and the I/O connection.

Function Block Diagram Language

The Function Block Diagram is a graphic language used to build complex procedures from a library of functions. Standard library functions such as math and logic may be combined with custom library functions such as dial up modem control, HART Interface, PID controllers and Modbus master and slave protocols to create Function Block Diagram application programs. The Function Block Diagram Editor is explained and a program is developed and added to the project. Topics such as Jumps and labels are explained and used.

Structured Text language

Structured Text is a high-level structured language, similar to Pascal and C, that is used for complex procedures or calculation that cannot be easily implemented using graphic languages. The Structured Text editor is used to develop Structured Text programs and functions that can be called from the Function Block Diagram language.

Sequential Function Chart Language

The Sequential Function Chart is a graphic language used to describe sequential operations in a process. The process is graphically partitioned into a set of well-defined steps containing actions performed using other languages such as ST, IL, LD and FBD. The Sequential Function Chart editor is used to develop a program that is included in the project.

Communication Protocols and ISaGRAF

This section of the training session focuses on the need for SCADAPack controllers, programmed in IEC-61131, to communicate with other controller and Host computers. Using custom functions to send master messages, defining and using Modbus registers and monitoring system communication is covered.

Notes

- It is recommended that as a minimum requirement each participant has a PC with a minimum of a Pentium processor and has Windows 98 or newer installed.
- The PC must have a CD ROM drive.
- The PC must have a serial port available.

Training Course Schedule

Note that the times below are for reference only. Times may be changed for individual courses.

Day One Overview

Introduction to SCADAPack hardware
Continue with SCADAPack hardware section
Series 5000 I/O modules
Firmware loader
IEC-61131 Programming Overview
ISaGRAF Workbench Overview
Exercise 1
Introduce Ladder Diagram Editor
Exercise 2

Day Two Overview

Continue Ladder Diagram Editor.
Exercise 3
Introduce Function Block Diagram Editor
Exercise 4
Build Custom Function Blocks
Continue Function Block Diagram Editor
Introduce Structured Text Editor
Exercise 5
Continue Exercise 5
Introduce Sequential Function Chart Editor
Exercise 6

Day Three Overview

Introduce protocol communication and ISaGRAF programs
Continue with protocol communication and ISaGRAF programs
Store and Forwarding
Additional Function Blocks
Course review