

# PROFINET with Industrial Ethernet

## General Information

Course Code: SCT-PTTIAPNA  
Length: 3 Days

## Audience

PLC programmers, engineers or maintenance personnel responsible for the maintenance, configuration, commissioning and/or planning of automation Ethernet networks with PROFIBUS.

TIA Portal is the base platform used, however the concepts and practices shown here are transferable to other platforms.

## Prerequisites

- MS Windows Expertise
- One of the following courses  
TIA Portal Programming 1 **OR**  
TIA Portal Service 2 **OR**  
Bridging STEP 7 5.x to TIA Portal Programming

## Profile

1.8 CEUs (Continuing Education Credits)

This course is for PLC users who will be responsible for the maintenance, configuration, planning and/or commissioning of automation Ethernet networks with PROFIBUS.

Siemens, a member of PROFIBUS International (PI), offers you the opportunity to learn about the future-oriented PROFINET, the open Industrial Ethernet standard for automation.

Through a deeper understanding of Ethernet and PROFIBUS mechanics along with SIMATIC NET components, you will learn how to parameterize commission and troubleshoot a PROFINET network quickly and effectively.

Numerous practical exercises reinforce the acquired theoretical knowledge.

## Objectives

*Upon completion of this course, the student shall be able to:*

- Identify many of the various network types used throughout a standard automation system.
- Identify the OSI 7 layers of Ethernet
- Calculate Ethernet IP ranges and subnets
- Configure a PC Ethernet card
- Reset PROFINET devices back to factory default
- Use the Primary Setup Tool (PST)
- Identify the functionality of the PRONETA tool.

- Wire an RJ45 connector.
- Use the TIA Selection Tool.
- Commission a PN system manually, with TIA Portal, using MMC's or C-Plug's.
- Commission a PN-IO system.
- Make use of LLDP for IO commissioning.
- Configure/Detect PN Topology.
- Read diagnostic/status information directly/from the program/HMI.
- Configure web support.
- View S7-1500/Scalance X208 web pages.
- Configure Ring (MRP) architecture.
- Diagnose MRP line defects.
- Configure Module-by Module Shared devices.
- Configure Submodule-by Submodule Shared devices.
- Configure Module-internal Shared inputs and outputs.
- Configure I-Device with/w-out Subordinate PN IO-System.
- Configure Cross-Project I-Device.

## Topics

1. Communication in the SIMATIC world
  - a. Industrial Ethernet
  - b. Industrial Wireless Communication
  - c. PROFINET I/O, ASi, IO-Link & their gateways
2. Basics of Industrial Ethernet
  - a. Industrial Ethernet Overview
  - b. ISO / OSI 7 Layer
  - c. IP / MAC / Subnet / Supernetting
  - d. IP Ranges / Calculations
  - e. **P**acket **I**nternet **G**roper (PING)
  - f. CSMA/CD, Duplex mode, Telegram types
  - g. HUB, SWITCH basics
  - h. Switching methods / Telegram Forwarding
3. Basics of PROFINET
  - a. PROFINET Basics
  - b. Device Addressing
  - c. Primary Setup Tool (PST)
  - d. PRONETA
4. Network Components
  - a. Architecture & Components
  - b. Optical, Wireless Medium
  - c. Communication Processors (CP)
5. PROFINET Configuration
  - a. PN IO - Manual Commissioning
  - b. PN IO – TIA Portal – w/Project
  - c. PN IO – TIA Portal – no Project
  - d. Device Exchange w/MMC or C-Plug
6. Topology Editor
  - a. PN IO - Automatic Commissioning
  - b. Link Layer Discovery Protocol (LLDP)

- c. Topology Configuration
- d. Working with Existing Topology
- e. Device Replacements – no MMC or C-Plug
- f. Device Name Change
- 7. Diagnostics
  - a. Diagnostics – LED's
  - b. Diagnostics – S7-1500 CPU System
  - c. Diagnostics – “Display Units” HMI Control
  - d. “IO2MOD” / “GEO2LOG” blocks – HW Identifier
  - e. “D\_ACT\_DP” block – Activate/Deactivate/Status
  - f. “Get\_Name” block – Device Name
  - g. “LED” block – Module LED Status
  - h. “DeviceStates” / “ModuleStates” blocks
- 8. Web Service for PROFINET
  - a. S7-1500 Web Server Configuration
  - b. Web pgs. – Diag./Info./Alarms/Logs/ & more
  - c. Scalance X208 Web pages
- 9. Ring Redundancy MRP
  - a. Introduction of the Ring Redundancy
  - b. Media Redundancy Protocol (MRP)
  - c. Diagnostics – Defective MRP line
  - d. MRP Configuration
- 10. Shared Device
  - a. Introduction Shared Device
  - b. Module-by-Module/Submodule-by-Submodule
  - c. MIS/MSO – Module-internal Shared IO
- 11. I-Device
  - a. Introduction I-Device
  - b. With/W-out Subordinate PROFINET IO-System
  - c. General Configuration
  - d. Cross-Project Configuration