

Introduction

The #5001 course has been developed to complete the industry-standard EC-NET^{AX} Certification Program. This in-class training introduces and describes key concepts and knowledge about the Niagara^{AX} framework and the EC-NET^{AX} software, and provides the hands-on opportunities needed to firmly establish the proficiency required in today's competitive marketplace. **Now included is a brand new *Lab Troubleshooting Guide* that greatly enhances the ability to assess challenging issues that may arise during the integration process.** Features related to both LONWORKS-based and BACnet-based integrations are covered in an easy and convenient method to provide the needed requirements to complete the Certification Program with confidence.

As part of this course, the Certification Program also includes a pre-requisite e-Training #501 that validates a working understanding of the key concepts and ensures EC-NET^{AX} Certification. The precertification e-Training #501 is available online on SmartTrack and must be completed prior to attending the #5001 classroom training.

Information

Course Duration	5 days
Certification Program	Niagara EC-Net ^{AX} Certification
Required Equipment	Company or personal laptop with: <ul style="list-style-type: none"> ■ Wireless card ■ Windows 7, XP, or Vista ■ Ability to turn off Windows firewall ■ Admin rights to download/install software
Pre-Requisites	<ul style="list-style-type: none"> ■ Functional knowledge of Windows and PCs including navigating the Window architecture, copying/pasting files, where to find Desktop files, etc. ■ e-Training #501 (online access is provided with #5001 registration) ■ Software (EC-Net^{AX}) pre-installed ■ Latest Support Pack and Productivity Enhancement Tools pre-installed
Helpful Assets	<ul style="list-style-type: none"> ■ LONWORKS Network Design knowledge ■ BACnet Network Design knowledge

Audience

- Network and System integrators
- Operations and maintenance engineers
- Energy management specialists
- Building automation systems installers
- Application Engineers

Objectives

Participants will:

- Install specific files to and commission an EC-BOS controller
- Create/review a simulated kitchen ventilation system and/or fitness center lighting system that controls a set of writable control points
- Explore the EC-NET^{AX} user interface
- Progressively build the control logic for and enhance the functionality of these simulated applications to include motion and luminance detection
- Create a personalized and customizable palette (object library)
- Customize the menus used to create new component and widgets (graphics)
- Explore the Help system and exploit its capabilities
- Create several heating applications using a Tstat and PID control loop
- Explore and sample from an extensive kit of control objects
- Establish connectivity with a second “supervisory” station through the Niagara Network
- Create and configure weekly and calendar schedules to control various types of loads
- Extend the functionality of Niagara objects to count runtime, to collect histories and to generate alarms
- Configure history and alarm properties
- Build plots and charts designed to view both real-time and historical trend data
- Export points, schedules, histories and alarms to a second “supervisory” station
- Create and configure a BACnet network using BACnet/MSTP
- Discover available devices and points on a BACnet network and capture those in the EC-NET^{AX} station database
- Create and configure a Lon network
- Discover available devices and points on a Lon network and capture those in the EC-NET^{AX} station database
- Create and configure a Px graphic, consisting of a variety of objects (e.g., fan, heating coil, cooling coil, damper, space temperature, occupancy, etc.)
- Create a navigation scheme that allows various users/user types the ability to have a unique Home page and to easily navigate the architecture
- Establish user access and security protocols needed to safeguard the integrity of an EC-NET^{AX} station
- Troubleshoot various challenges that may arise when building applications

Overall Course Structure

DAY 1

- Opening Exercise
- Course Introduction
- Platforms & Stations
- Review of Fundamentals
- Building Simple Control Logic: Linking & Configuring Control Points
- Building a Simple Px Graphics View, Part 1
- Building Simple Control Logic: Adding Extensions to Control Points
- Building a Simple Px Graphics View, Part 2
- Building Simple Control Logic: Adding Additional Functionality

DAY 2

- Review of Day 1 / Agenda for Day 2
- Building Simple Control Logic: Adding Additional Functionality
- Customizing the Workbench Environment
- Building Control Applications: Using the Kit Control Palette
- Building Simple Control Logic: Simulating a Fluctuating Value
- Building Simple Control Logic: PID Loops
- AX Supervisor Stations
- Driver Architecture
- Niagara Network
- Schedule Objects

DAY 3

- Review of Day 2 / Agenda for Day 3
- Histories
- Alarms
- Field Bus Integrations
- Bacnet Integration
- Lon Integration

DAY 4

- Review of Day 3 / Agenda for Day 4
- Px Graphics Fundamentals: Part 1
- Px Graphics Fundamentals: Part 2
- Security & User Administration
- Building a Custom Navigation Scheme
- Provisioning Service (optional)
- Web Service (optional)
- Time Synch Service (optional)
- Weather Service (optional)
- Preparations for Certification Test

DAY 5

- Niagara^{AX} Technical Certification Program Final Exam

Course Outline

DAY 1

Opening Exercise

Create a New Station/Commission the EC-BOS (LAB #1)

- New Station wizard
- Commissioning wizard
- Platform/Station connections
- Remote vs. local host

Course Introduction

- Logistics
- Breaks
- Course Structure
- Materials – electronic comprehensive set of student files, in-depth Lab Troubleshooting Guide, Key AX Terminology Guide, Student Guide

Platforms & Stations

- Platforms
- Stations
- Review: Platform Services
- Review: Platform Tools

Review of Fundamentals

- Niagara objects
- Viewing & working with components
- Default/standard views
- Characteristics: Out property, Facets, Status flags, Priority levels
- Right-click, Action and New menus
- Palettes

Working With Basic Niagara Objects (Class Activity)

Lighting Control (LAB #2)

Building a Simple Px Graphics View, Part 1

- Graphics challenge
- The overall process
- What is Px?
- What is a Px view?
- Creating a new Px view
- Px files
- Px modes – View/Edit
- Using the Px Editor

- Widgets
- Binding to real data via Ords
- Make Widget Wizard
- Px-in-a-browser

Lighting System Px (LAB #3)

Building Simple Control Logic: Adding Extensions to Control Points

- Why Extensions?
- Categories of extensions
- What is a proxy extension?
- Types of control extensions
- Compositing: exposing child slots
- Using the Composite Editor

Control Extensions (LAB #4)

Building a Simple Px Graphics View, Part 2

- Widget properties
- BFormat
- Binding properties
- More about Ords
- Redefining an Ord
- Display name labels
- Using hyperlinks

Burn Time Px (LAB #5)

Building Simple Control Logic: Adding Additional Functionality

- Some kitControl objects
- Using a Boolean (digital) input to detect motion (simulating a motion sensor)
- Using the Link Editor to pin open slots
- Using a Numeric (analog) input to detect sunlight (simulating a luminance sensor)

Motion Sensor (LAB #6)

DAY 2

Review of Day 1 / Agenda for Day 2

Building Simple Control Logic: Adding Additional Functionality

- Using a Numeric (analog) input to detect sunlight (simulating a luminance sensor)

Luminance (LAB #7)

Customizing the Workbench Environment

- Managing tabs in the view pane
- Customizing the New Components and New Widgets menus
- Creating a personal palette
- Toolbar—Options
- User folder (Local host) – options, recent Ords, Px Editor, Nav tree, credentials, recent history, etc.

Customizing the Workbench (LAB #8)

Building Control Applications: Using the Kit Control Palette

- kitControl components: categories and locations
- Extensions and kitControl components

Building Simple Control Logic: Simulating a Fluctuating Value

- Point folder
- Ramping
- Offset & amplitude settings
- Numeric constant

Tstat: Creating a Thermostatic Control Application (LAB #9)

Building Simple Control Logic: PID Loops

Explore a proportional only (gain-based, closed circuit) control loop application

- PID loops
- Ramping
- Linear sequencing
- Exposing slots

Creating a Control Loop (LAB #10)

AX Supervisor Stations

- Supervisor stations
- Config.bog

Creating a Supervisor Station (LAB #11) (Class Exercise)

Driver Architecture

- Network architecture
- Driver Manager
- Common network components:
 - Network status properties, monitor, tuning policies, additional network components (communication and poll components)
- Device Manager
- Types of device extensions
- Point Manager
- Proxy points

Niagara Network

- Niagara Network components: Fox service
- Station Manager
- Station Learn and Discover

Working With the Niagara Network (Lab #12)

- Niagara Station: Station status properties, Client connection properties, Server connection properties
- Station-to-station connections
- BQL Query Builder: BQL Query Find filters, BQL Query Match filters
- Station Histories Import and Export
- Station Alarms Properties
- Station Schedules Import and Export

Niagara Network Proxy Points (LAB #13)

Schedule Objects

- Weekly schedule object types: Boolean, Numeric, Enum, String
- Calendar schedule
- Trigger schedule
- Creating schedules
- Schedule settings: weekly schedule, special events, properties
- Referencing a calendar
- Importing schedules
- Master/slave schedules

Creating & Configuring Schedules (LAB #14)

DAY 3

Review of Day 2 / Agenda for Day 3

Histories

- History extensions – Boolean, Numeric, Enum, String
- History Service
- Viewing histories
- History maintenance
- Using the History Chart Builder

Histories (LAB #15)

- Importing/exporting histories
- Constructing History Groupings (optional)

Controlling & Exporting Histories (LAB #16)

Alarms

- Alarm Service
- Alarm classes
- Alarm recipients
- Alarm extensions
- Viewing alarms
- Managing the alarm database
- Alarm portal

Alarms (LAB #17)

Field Bus Integrations

- Common field bus concepts
- Driver architecture framework
- Discovering vs. creating devices and points

Bacnet Integration

- Network architecture
- Local device
- Bacnet Comm
- Tuning policies
- Device Manager
- Device objects
- Point Manager
- Proxy points

Bacnet/MSTP Integration (LAB #18)

Lon Integration

- Network architecture
- Network views
- Understanding Learn scenarios
- Device objects
- Commissioning the Lon device
- Proxy points
- Managing links (Lon Links Manager)
- Matching subnet nodes
- Upload
- Establishing system setpoints

Lon Integration (LAB #19)

DAY 4

Review of Day 3 / Agenda for Day 4

Px Graphics Fundamentals: Part 1

- What is Px?
- Px views
- Creating new Px views
- Px files
- Px modes: View/Edit
- Using the Px Editor: Canvas pane, Side bar pane
- Widgets
- Editing widget properties
- BFormat
- Animating widget properties
- Bindings & binding properties
- Using the Make Widget Wizard
- Redefining an Ord
- Adding a binding to an object
- Source: Bound labels
- Source: From Palette
- Source: Actions
- Source: Time Plot
- Source: Charts – History Point List
- Source: Charts – History Chart
- Px-in-a-browser

Presentation Graphics (LAB #20)

Px Graphics Fundamentals: Part 2

- Sources of images/widgets
- Additional Px Editor tools
- Spectrum binding
- Relativizing Ords
- Replace in Ords
- Weather Service graphic example

Security & User Administration

- Station security
- Design considerations
 - When structuring categories
 - When adding users
 - When assigning permissions
- What are users, categories and permissions?
- Security model
- Category Service

- Category Manager
- Category Browser
- Enhanced security features (AX 3.5, 3.6 and 3.7)
- Advance platform/station encryption support
- Strong password requirements and best practices
- User Service
 - User Manager
 - Permissions Browser
 - Adding, modifying, and deleting users
 - Assigning permissions
 - User profiles – Workbench and browser

Security and User Admin (LAB #21)

Building a Custom Navigation Scheme

- What is custom navigation?
- Process
- Using the Nav File Editor
- Creating a custom Home node
- Assigning the Nav file to a specific user
- Testing the Nav file in the Workbench and in a web browser

Creating a Nav File (LAB #22)

Provisioning Service (optional)

Web Service (optional)

Time Synch Service (optional)

Weather Service (optional)

Preparation for Certification Test

DAY 5

Niagara^{AX} Technical Certification Program Final Exam

DISCLAIMER

This training is intended to provide technical information on a particular subject or subjects and is not an exhaustive treatment of such subjects. Accordingly, the information in this training is not intended to constitute application, design, software or other professional engineering advice or services.

Distech Controls does not warrant the completeness, timeliness or accuracy of any of the data contained in this document and web site and may make changes at any time in its sole discretion without notice.

Confidentiality Notice

The information contained in this document is confidential information of Distech Controls, Inc. Such information and the software described herein, is furnished under a license agreement and may be used only in accordance with that agreement.

The information contained in this document is provided solely for use by Distech Controls employees, licensees, and system owners; and, except as permitted under the below copyright notice, is not to be released to, or reproduced for, anyone else.

While every effort has been made to assure the accuracy of this document, Distech Controls is not responsible for damages of any kind, including without limitation consequential damages, arising from the application of the information contained herein. Information and specifications published here are current as of the date of this publication and are subject to change without notice. The latest product specifications can be found by contacting our corporate headquarters, Brossard, Quebec.

Trademark Notice

BACnet and ASHRAE are registered trademarks of American Society of Heating, Refrigerating and Air-Conditioning Engineers. Microsoft and Windows are registered trademarks, and Windows NT, Windows 2000, Windows XP Professional, and Internet Explorer are trademarks of Microsoft Corporation. Java and other Java-based names are trademarks of Sun Microsystems Inc. and refer to Sun's family of Java-branded technologies. Mozilla and Firefox are trademarks of the Mozilla Foundation. Echelon, LON, LonMark, LonTalk, and LonWorks are registered trademarks of Echelon Corporation. Niagara Framework, Niagara^{AX} and Niagara^{AX} Framework are registered trademarks of Tridium, Inc. EC-BOS and EC-Net^{AX} are registered trademarks of Distech Controls, Inc. All other product names and services mentioned in this publication that are known to be trademarks, registered trademarks, or service marks are the property of their respective owners.

Copyright and Patent Notice

This document may be copied by parties who are authorized to distribute Distech Controls products in connection with distribution of those products, subject to the contracts that authorize such distribution. It may not otherwise, in whole or in part, be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form without prior written consent from Distech Controls, Inc.

Copyright © 2013 Distech Controls, Inc. All rights reserved.

The product(s) described herein may be covered by one or more patents of Distech Controls, Inc..